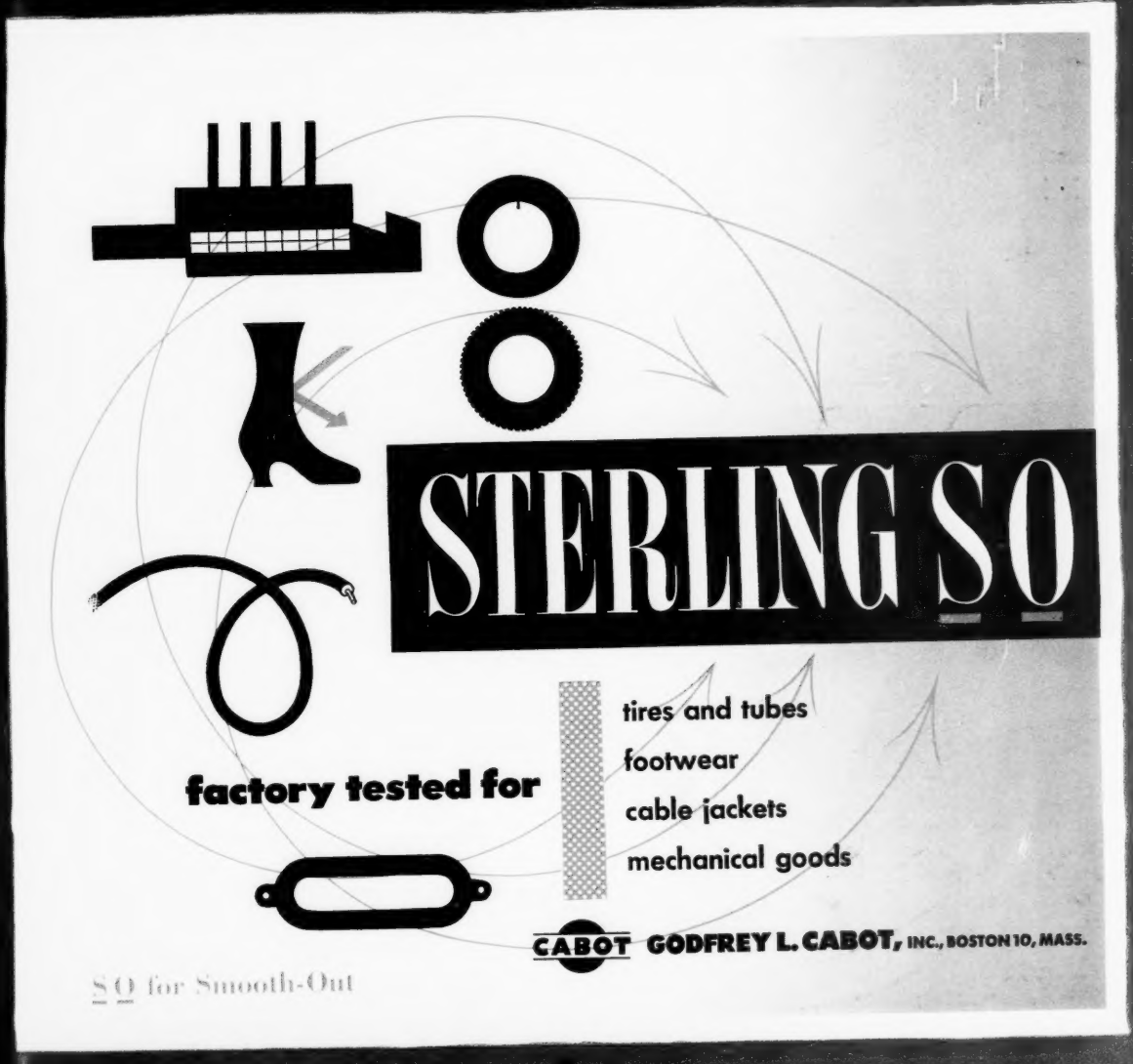
INDIA RUBBER WORLD

FEBRUARY, 1948

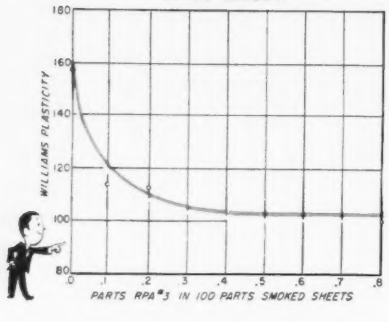


Du Pont RPA NO. 3

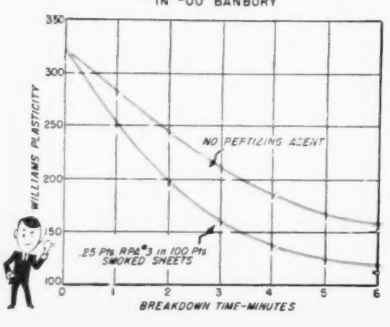
Photograph courtesy of Farrel Birmingham Inc.

CAN INCREASE YOUR BANBURY CAPACITY...

EFFECT OF CONCENTRATION OF RPA 3 ON WILLIAMS PLASTICITY OF 1800 GRAM BATCH OF SMOKED SHEETS AFTER 6 MINUTES BREAKDOWN IN #00 BANBURY



EFFECT OF BREAKDOWN TIME ON PLASTICITY OF 1800 GRAM BATCH OF SMOKED SHEETS IN #00 BANBURY



Check these advantages:

- **Shortens Breakdown Time**
- **Reduces Breakdown Costs**
- **Improves Processing Quality of Rubber Stocks**

Tune in to Du Pont "Cavalcade of America," Monday Nights—8 p. m. EST, NBC

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co., (Inc.), Wilmington 98, Del.

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

DU PONT

INDIA RUBBER WORLD, February, 1948, Vol. 117, No. 5. Published Monthly by BILL BROTHERS PUBLISHING CORP., Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second-Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; Canada, $4.00; All Other Countries, $5.00; Single Copies 35 Cents. Address Mail to New York Office.

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FEB 26 1948
DETROIT

TWO NEW HYCAR AMERICAN RUBBERS

Hycar OR-25 EP *(Easy Processing)*
Hycar OR-25 NS *(Non-Staining)*

HERE are two new American rubbers, both with superior processing characteristics. Hycar NS and Hycar EP differ only in that a special anti-oxidant has been used in the NS, making it non-staining and non-discoloring. This is an outstanding quality, particularly desirable in the fabrication of light colored products. The new Hycar rubbers have all these advantages over the regular process Hycar OR-25:

1. They band on the processing mill speedily—cut mill mixing time.
2. Better extrusion characteristics—less nerve and less heat build-up.
3. Excellent high temperature mixing.
4. Better fusion and mold flow characteristics.
5. Increased building tack for laminated products, such as frictioned stocks and calendered sheeting.

Both rubbers retain those properties which make Hycar American rubbers so usable for so many products . . . permanent resiliency and superior resistance to oil, abrasion, and aging. Ask your supplier for parts made from Hycar. Or write to Dept. HA-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Roses are Red, Violets are Blue, Philblack O is Great Stuff, too!

YOU'LL LOVE PHILBLACK O, the HAF (high abrasion furnace) black that gives rubber products excellent resistance to abrasion. In addition your products will have a long flex-life with a minimum of cut and crack growth!

Use Philblack O once and you'll love him forever! We can give you convincing statistics to prove this (just write for the results of laboratory tests on Philblack O) but the best way to find out, is to put it into production now.

PHILLIPS PETROLEUM COMPANY

Rubber Chemicals Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

SIMPLE RUBBER MATHEMATICS!

x (MONEX — TETRAMETHYLTHIURAM MONOSULFIDE) + y (M-B-T — MERCAPTOBENZOTHIAZOLE)

EQUALS

SAFE, POWERFUL, ECONOMICAL, ACCELERATION FOR NATURAL RUBBER, GR-S and GR-I

WHERE x EQUALS 0.1 IN NATURAL RUBBER; 0.1 - 0.2 IN GR-S; 1.0 - 1.25 IN GR-I ON 100 PARTS R.H.C.

AND y EQUALS 1.0 - 1.5 IN NATURAL RUBBER; 1.0 - 1.5 IN GR-S; 0.5 IN GR-I

EQUALLY SIMPLE AND EFFECTIVE ARE MONEX + M-B-T-S (BENZOTHIAZYL DISULPHIDE) OR O-X-A-F (ZINC SALT OF MERCAPTOBENZOTHIAZOLE)

MONEX · M-B-T · M-B-T-S and O-X-A-F are NAUGATUCK ACCELERATORS

Process — Accelerate — Protect with NAUGATUCK CHEMICALS

Write for a New Bulletin— ***"MONEX AS AN ACTIVATOR FOR THIAZOLES"***

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Division of United States Rubber Company

1230 AVENUE OF THE AMERICAS • NEW YORK 20, N. Y.

IN CANADA: *Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ont.*

THE CYCLONE

that keeps America Tire Valve, Cap, Core and Gauge conscious

Schrader advertisements carry into every corner of America, day in and day out, how Schrader Products help give longer tire life—how to get sturdy service down to the last mile built into tires. This great job gives motorists, fleet owners, dealers and jobbers—one and all—the facts of Schrader dependability and wins universal customer and dealer acceptance of Schrader equipped tires and tubes.

Wherever tires roll—wherever they are serviced, the Standard Schrader Valve has also made possible these benefits to the public:

Standardization of
(1) air pressure and inflation connections;
(2) pressure gauging equipment;
(3) replacement parts, stocks and service tools, and the standardization of "know how", through the tremendous advertising cyclone, everywhere tires are serviced.

SCHRADER PRODUCTS Make Tires Last Longer!

Schrader
PRODUCTS
CONTROL THE AIR

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World's Largest Manufacturer of Tire Valves, Gauges and Accessories

Good-rite
VULTROL
for use in American rubber compounding
to prevent scorching, and for recovering
scorched stocks
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For technical data please write Dept. CA-2

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

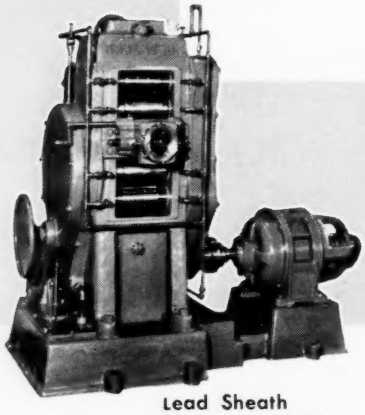
QUALITY BUILT *to meet* EXACT REQUIREMENTS

Quality in machine construction is often invisible. Its presence, however, is always shown by tangible results. Users of Robertson machines find that an investment in quality is profitable . . . that it pays excellent dividends in accuracy, speed and dependability of production.

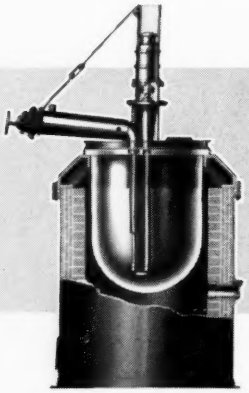
The people who design and build Robertson machines know that a dimension is only as accurate as the instrument with which it is measured. They, therefore, use the most accurate instruments obtainable. These craftsmen also know that any degree of quality can be just as high as they use their intelligent skill to make it . . . and, realizing that "high-quality" is the keystone of Robertson reputation, devotedly follow every detail of plus and minus tolerances.

Let us cooperate with you on your requirements.

Above: A typical Robertson Hose Lead Encasing Press. Incidentally, we believe that more Garden Hose is lead encased on Robertson's, than on any other presses in the world. We design and build to requirements all types of lead encasing and allied equipment for rubber hose and electric cable manufacturers.



Lead Sheath Stripping Machine



Open Lead Melting Pot

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Designers and Builders of all Types of Lead Encasing Machinery

Since 1858

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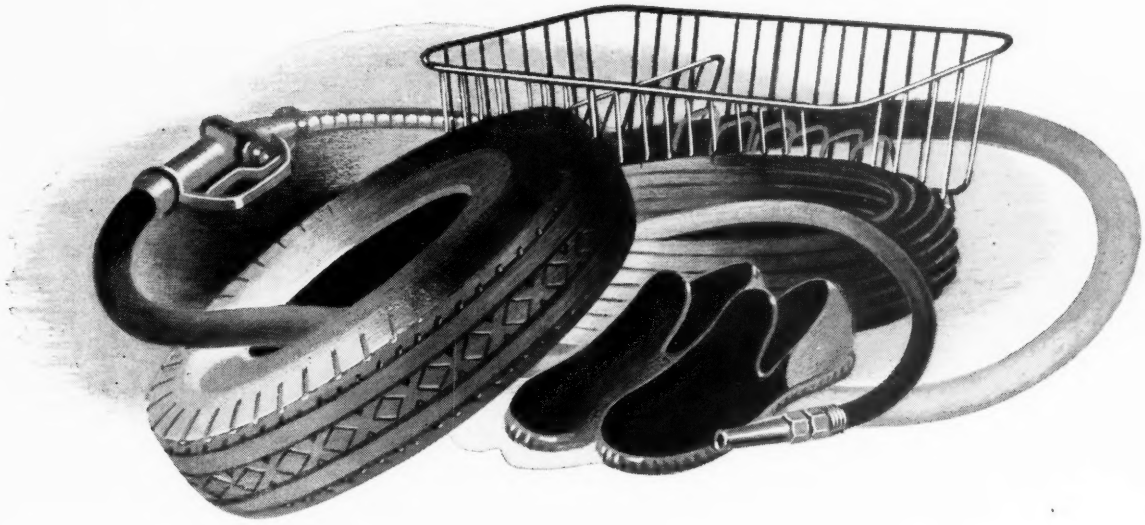
Offers the Rubber Industry



STYRENE MONOMER
—for the production of copolymers and elastomers
—also for the production of low-pressure laminating syrups

DI-BUTYL-PARA-CRESOL
—as an anti-oxidant with non-staining properties

DI-BUTYL-META-CRESOL
—as a softener for some types of synthetic rubbers and in the production of rubber-processing chemicals

DI-AMYL-PHENOLS
—as a softening agent and for the production of rubber processing chemicals

RESORCINOL AND RESORCINOL RESINS
—for compositions to improve adhesion of rubber to cord, for the synthesis of rubber processing chemicals and for adhesives

DI-VINYL-BENZENE
—for the production of cross-linking during polymer production

We will welcome your inquiries about any of these chemicals.

K KOPPERS

KOPPERS COMPANY, INC.
CHEMICAL DIVISION
Pittsburgh 19, Pa.

KOPPERS COMPANY, INC. IRW
Chemical Division
Pittsburgh 19, Pa.

Please send me a copy of your bulletin, C-7-103, "Products of the Chemical Division."

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Company_____

Address_____

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GLYCERIZED LUBRICANT

(LIQUID CONCENTRATE)

Superlative Dip

for hot rubber slabs to prevent adhesion when piled . . . banishes dust nuisance by replacing soapstone, talc . . . prevents sticking during cure of extrusions, tubing when coiled on flat pan . . . excellent lubricant for molds, mandrels, air bags, belt drums, etc. . . . washing, finishing inner tubes, etc.; imparts satiny finish . . . ideal for processing insulated wire, cable . . . truly versatile lubricant for natural, reclaim or synthetic rubbers.

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RUBBEROL AND SYNTHOL

GET THE GENUINE from GENSEKE

AVAILABLE ONLY IN DRUMS, HALF DRUMS AND QUARTER DRUMS

QUALITY SINCE 1884

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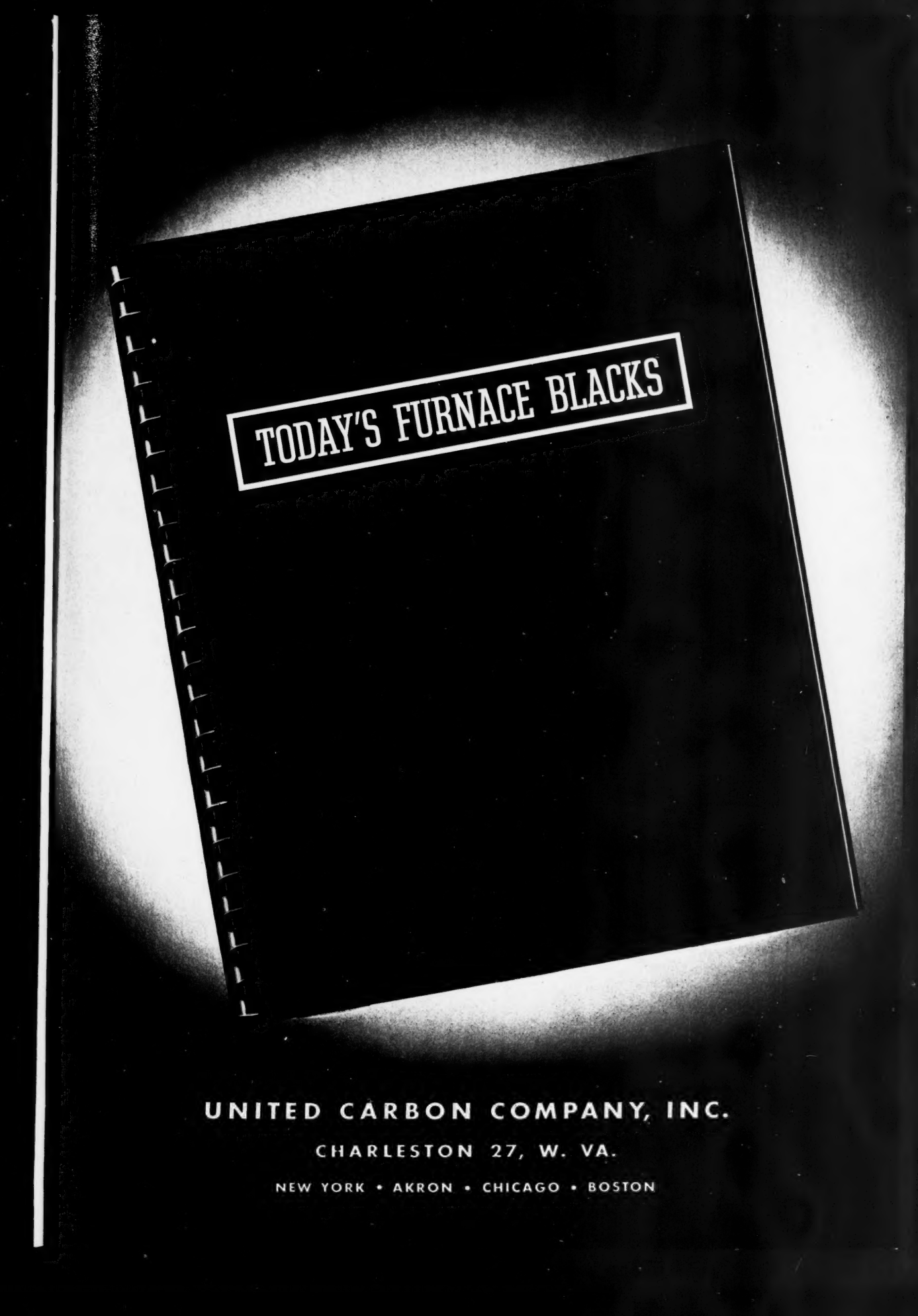

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More and more CARBON BLACK users are seeking in furnace blacks the means of solving their manufacturing problems and of bettering the performance of the finished products.

For a wealth of fundamental information on all types of furnace blacks and new developments, your attention is directed to our new book

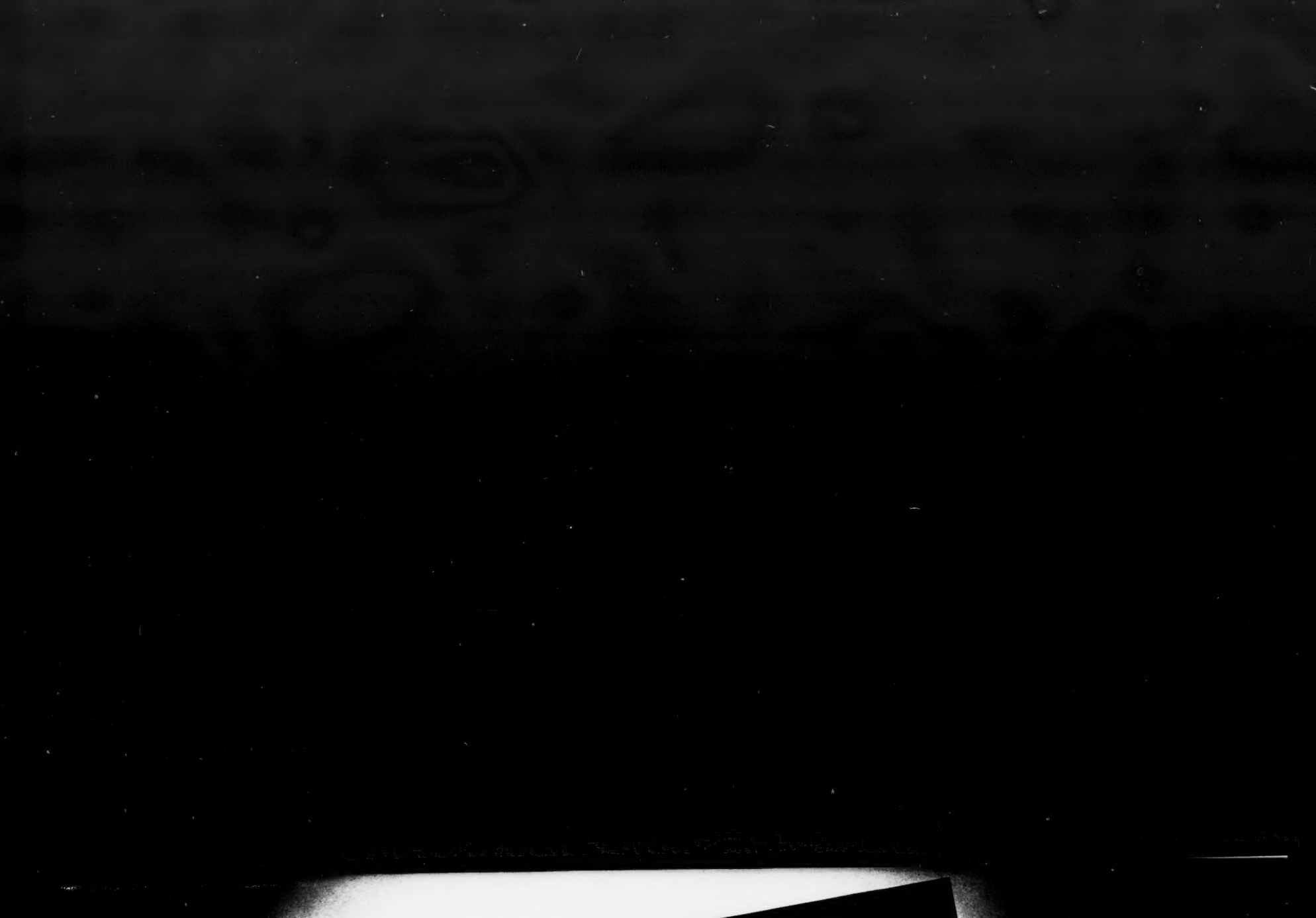
"TODAY'S FURNACE BLACKS"

It should prove exceedingly helpful to you. A copy is yours for the asking. It may be obtained from our sales offices in New York, Akron, Chicago and Boston, or from our Research Division in Charleston, West Virginia.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia



HERE'S a welcome answer to the critical shortage of balata—**PLIOLITE S-6.**

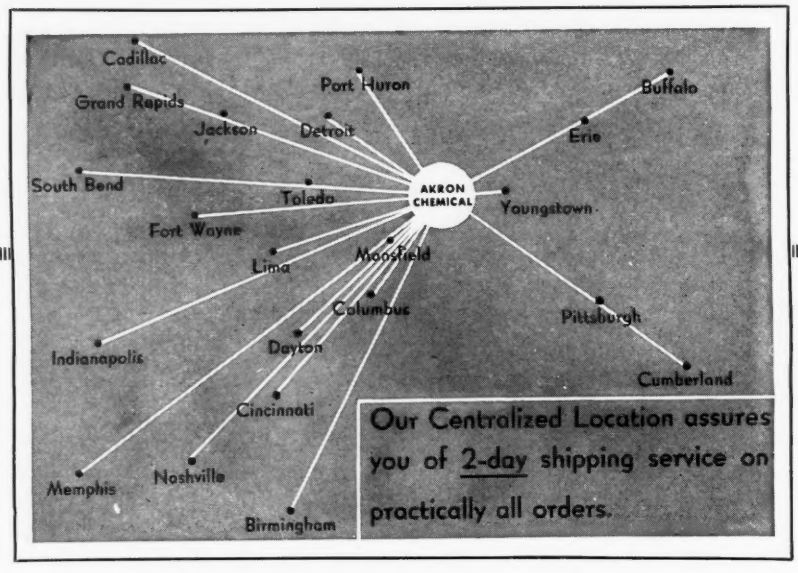
This unique reinforcing agent not only extends the available supply of balata, it actually improves some of its properties—such as cut resistance, click and driving range.

Best of all, **PLIOLITE S-6** can be used in amounts up to 30% of the total formulation, thereby greatly reducing the cost.

PLIOLITE S-6 is available as a powder for your own mixing, or in master batches in whatever synthetic you select. For complete information and sample write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

GOODYEAR

Pliolite—T.M. The Goodyear Tire & Rubber Company



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Organic Reds—Blues—Yellows—Greens—
Chrome Yellow—Ultramarine Blue.

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HUBER *Clays and Softeners*

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ANNOUNCES

TWO NEW RECLAIMS

2017

1018

Both these grades are readily workable, with good milling, calendering and tubing properties. They mold easily, leaving clean surfaces. Cured physicals are excellent.

These grades are blends of synthetic and natural rubbers, and hence will provide a stable and unlimited source of supply. Write for samples and full details.

U. S. RUBBER RECLAIMING COMPANY, INC.

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TRENTON . . . H. M. ROYAL, Inc., 689 Pennington Avenue

66 Years Serving the Industry Solely as Reclaimers

BOSTIK Customized Adhesives have been Completely Successful in Solving Our Tough Bonding Problems

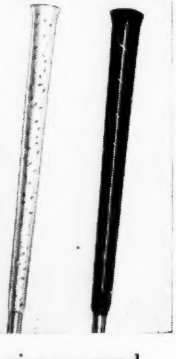
Photo illustrates unusual adhesive strength of BOSTIK

THE SPRINGFIELD COMPANY

The Springfield Company, Springfield, Mass., manufacturer of quality athletic equipment, had two special adhesive problems:

1. An adhesive which would securely bond together the layers of the final winding of fine gauge cotton used in all top grade softballs and baseballs. *This same adhesive must also bond the outside leather cover to the ball's center.*

2. An adhesive which would firmly bond the cork-and-rubber composite grip foundation to steel golf club shafts. *This same adhesive must also bond the outer leather grip to the cork-and-rubber foundation.*



Says Mr. Roger Heroux, Purchasing Agent:

"In solving both of these very tough bonding problems, BOSTIK *Customized* Adhesives have been completely successful. They give a sure, lasting tack. As a matter of fact, BOSTIK tackiness is so permanent that we never have to use activating agents when completing work on jobs which have been given their BOSTIK coatings *as much as six months previously.* In considering that professional athletes give our products the toughest possible usage, it is obvious that the adhesives which go into our products have to be especially good. BOSTIK certainly is superior!"

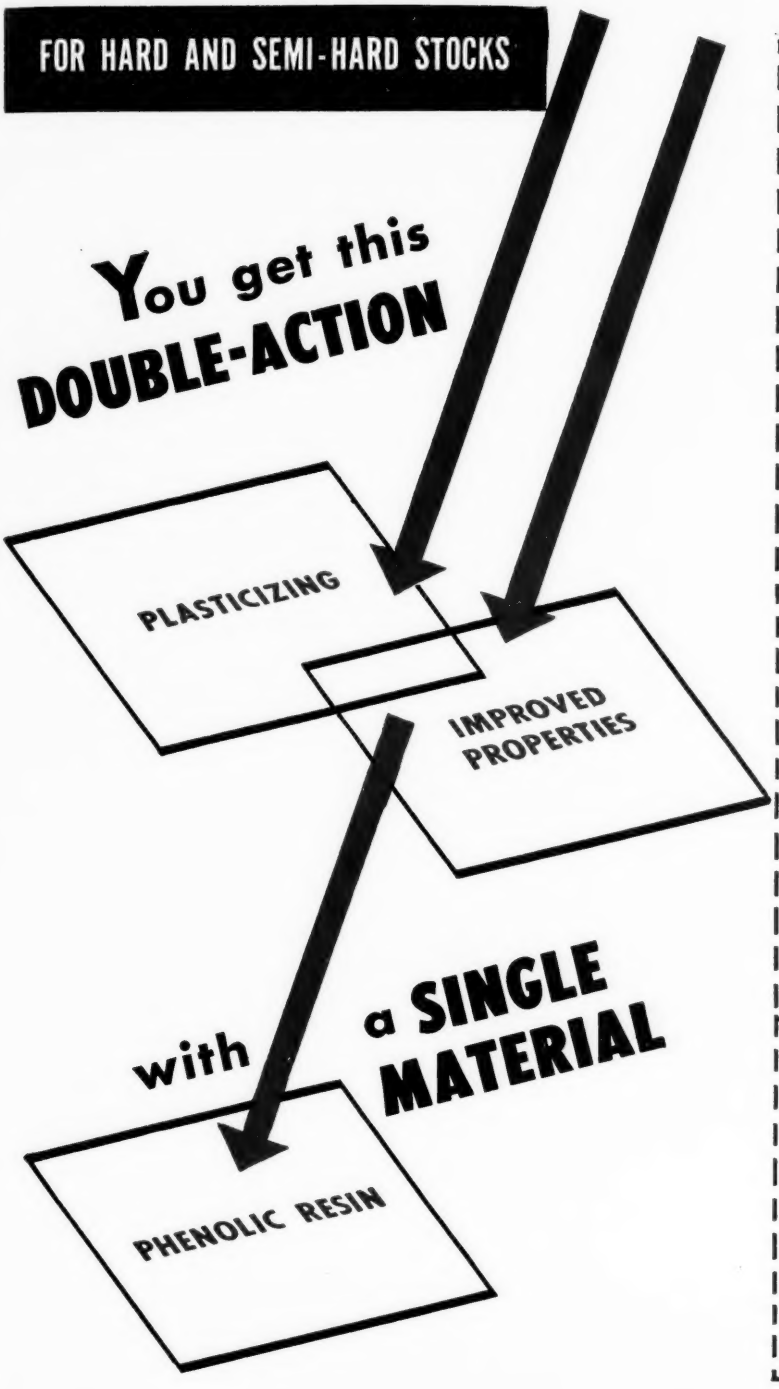
There's a BOSTIK *Customized* Adhesive to bond any material to any material in any combination. Write for details today — ask for your copy of "Adhesive Facts."

B B CHEMICAL COMPANY, CAMBRIDGE, MASS.

"Whatever It Is BOND IT WITH BOSTIK"

Customized Adhesives

FOR HARD AND SEMI-HARD STOCKS



Extraordinary, but true. Specially developed Durez phenolic resins have the two-fold action of a plasticizer and a reinforcing agent. With Buna-N and GR-S rubbers, the advantage of phenolic resins has been so clearly demonstrated that they are now in use for commercial runs. Easier processing, high loading, and excellent extrusions, with thermosetting properties resulting in improved product characteristics, are reasons for investigating Durez resins now. Write for "Durez Resins in the Rubber Industry." Durez Plastics & Chemicals, Inc., 302 Walck Rd., N. Tonawanda, N. Y.

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Durez Powdered Phenolic Resin . . . for

BUNA-N

Completely compatible

Processes readily in regular equipment

Produces good flow, easy molding, fast cures

Improves tensile strength, elongation, hardness, surface finish

Gives high abrasion, solvent, and oil resistance

13355

Durez Powdered Phenolic Resin . . . for

GR-S

Plasticizing action simplifies processing

Increases—hardness
—toughness
—abrasion
—heat resistance

Improves surface finish of cured stocks

DUREZ

PHENOLIC RESINS

MOLDING COMPOUNDS

INDUSTRIAL RESINS

PROTECTIVE COATING RESINS

PHENOLIC RESINS THAT FIT THE JOB

Announcing...

a NEW name

The name of this Corporation has been changed

from **P. W. MARTIN GORDON CLAYS, INC.**

To... **SOUTHERN CLAYS, Inc.**

P. W. Martin Gordon Clays, Inc., was for many years the producing unit for the domestic clay business of Moore and Munger, developing and supplying the best grades of clay for the rubber industries. Our policy of direct sales to customers became effective August 1, 1947, and we have decided to adopt a corporate name more descriptive of our products.

Our experienced plant personnel in Georgia has not been changed. Mr. W. H. Shields continues as Sales Manager with Mr. E. W. Schwartz in the rubber industry.

We shall continue to supply the best clays possible for every purpose and to collaborate with our customers to meet their requirements.

STANMOCO hydraulic toggle presses

EQUIPPED WITH KNOCKOUTS OFFER BIG LABOR SAVINGS

CLOSED

OPEN

Specifications

Platens	34"x 34"
Maximum Opening	14½"
Pressure	200 Tons

Operation: Manual or automatic through use of cycle timers.

Press designed for use with 750 pounds hydraulic oil pressure.

Press can be furnished with or without hydraulic pumping unit.

Special knockouts can be furnished to meet individual requirements.

Presses can be furnished complete with molds and knockouts for any special molding job.

Write for complete details

The Akron Standard Mold Co.

Akron — *The Established Measure of Value* — Ohio

NATURAL LATEX
and
NATURAL LATEX
COMPOUNDS
Available from
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Your Inquiries Solicited
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Reds Yellows

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- SOFT AND EASY TO GRIND
- BRIGHT CLEAR COLORS
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- ALKALI RESISTANT
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- NON BLEEDING
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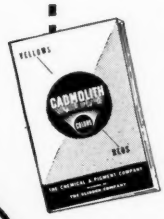
With a combination of advantages found in no other red or yellow pigments, Glidden Cadmolith Colors are now adding new sales appeal and lasting beauty to wallpaper; vinyl coatings, fabrics, paper, printing inks, plastics, enamels, leathers, lacquers, rubber and many other products.

The superiority of Cadmolith pigments is the direct result of Glidden's recognized leadership in research. All shades are available for prompt shipment. Your inquiry is invited.



Send for folder giving complete details, with color chips. Write The Chemical & Pigment Company, division of The Glidden Company, Union Commerce Building, Cleveland 14, Ohio.

QUALITY Glidden PRODUCTS

THE CHEMICAL & PIGMENT COMPANY
Division of
THE GLIDDEN COMPANY
Baltimore, Md. • Collinsville, Ill. • Oakland, California

SUNOLITH Lithopone
ASTROLITH Lithopone
ZOPAQUE Titanium Dioxide
CADMOLITH Cadmium Red and Yellow Lithopone

ORE, AIR, WATER, DRILL and Skill
Essential Production Tools in the Manufacture of ZnO
ST. JOE Lead Free ZINC OXIDE
ST. JOSEPH LEAD COMPANY

The first and Final steps

IN THE PRODUCTION OF ST. JOE Lead-Free ZINC OXIDES

In a series of advertisements during the past two years, every important phase in the manufacture of our Zinc Oxides has been featured.

The advertisement reproduced here in miniature shows the first step—a drillman at work in a stope of one of our zinc mines in upper New York State. Now, after many complicated operations, St. Joe Zinc Oxides are being packed in bags for shipment to the consuming industries where the exceptional purity and uniformity of these pigments have long been famous.

ST. JOSEPH LEAD COMPANY

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Plant & Laboratory: Josephtown, Beaver County, Pennsylvania

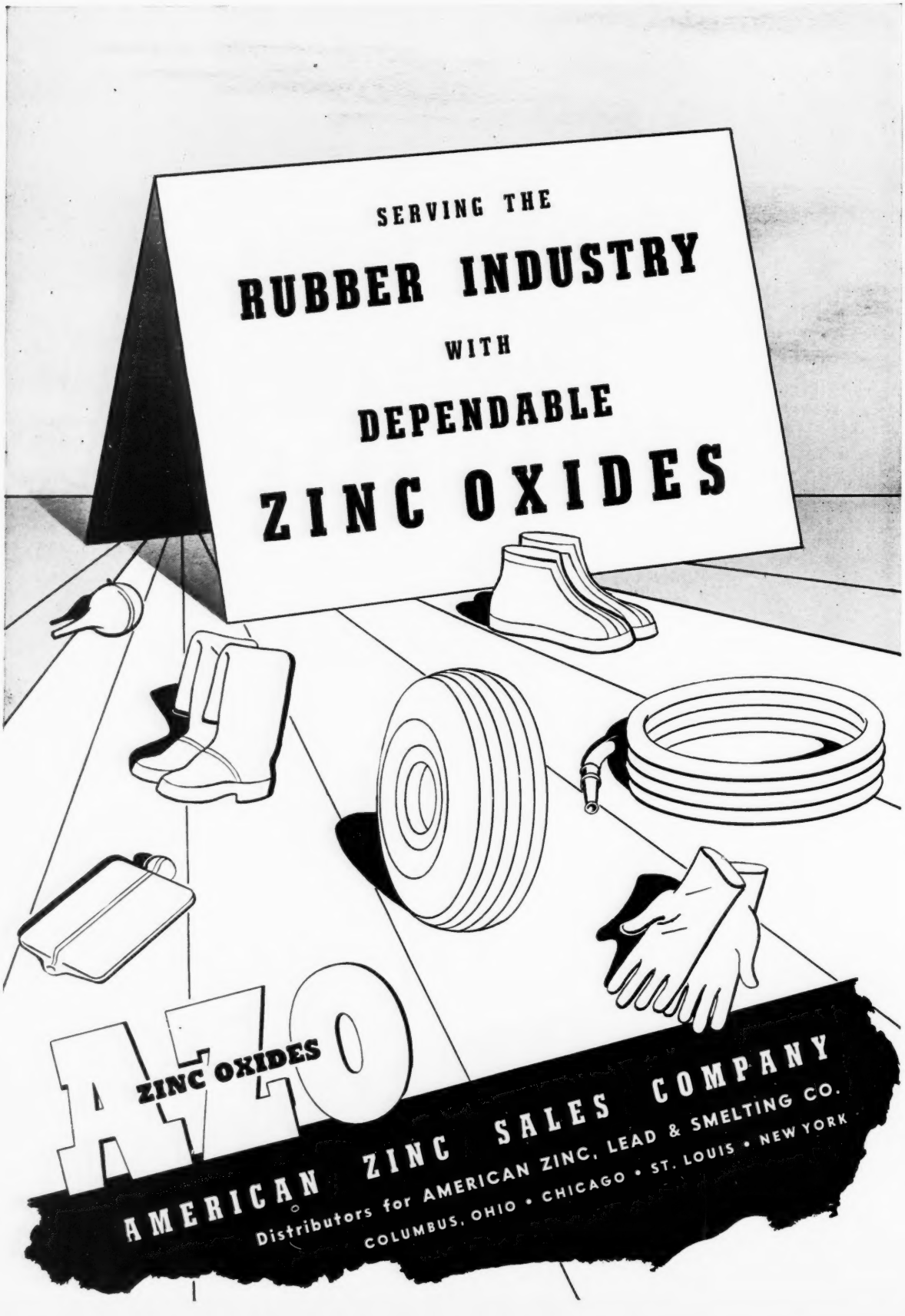
C O-O P E R A T I O N

BAKELITE CORPORATION • NEW PLASTIC FILM PLANT AT OTTAWA, ILLINOIS

A completed project . . . the result of a cooperative effort between the Bakelite Corporation and Giffels and Vallet, Inc. . . . From production objectives; all phases of plant layout, equipment procurement, and building engineering were developed using the skills of these two organizations in order that the best possible plastic film plant should be created . . . so that the capital investment might bring greatest results in the shortest time.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION
1000 MARQUETTE BUILDING, DETROIT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AMERICAN ZINC SALES COMPANY
Distributors for AMERICAN ZINC, LEAD & SMELTING CO.
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Neoprene dipped goods STAY FLEXIBLE

S/V Sovaloid N Improves Flexure and Aging Characteristics

USED in concentrations of 10-20 parts, S/V Sovaloid N offers outstanding advantages as a plasticizer for dipped goods made with Neoprene Latex.

Extensive tests have shown good flexure and aging qualities with exceptional resistance to stiffening with age, even when goods are stored for long periods on dealers' shelves. These advantages are obtained without loss of color qualities, tensile strength, elongation or other important features. In most cases, the physical properties of the finished products are definitely improved.

There is no indication of exudation or oxidation. Various quantities of the S/V Sovaloid N may be used to produce different degrees of tackiness as desired. Preparation and manufacture are comparable with the methods used with conventional plasticizers.

Ask your Socony-Vacuum Representative for recommendations for your particular needs.

SOCONY-VACUUM OIL COMPANY, INC.
26 Broadway, New York 4, N.Y., and Affiliates:
MAGNOLIA PETROLEUM COMPANY
GENERAL PETROLEUM CORPORATION

What's New in Petroleum for Rubber?

Low Temperature Flexibility . . . S/V Sovaloid L retards stiffening of Neoprene.

GR-S Plasticizers . . . S/V Sovaloids H&W plasticize GR-S, process durable compounds.

Neoprene Softeners . . . S/V Sovaloid N. No "blooming"—true softener type.

Sun-Check Wax . . . S/V Petrosene C* prevents surface cracking.

GR-N Plasticizer . . . S/V Sovaloid C* fully compatible with all types of GR-N.

Sponge Rubber . . . Special emulsions assist manufacture of Neoprene sponge.

*Temporarily short in supply.

Process Products
SOCONY-VACUUM

Socony-Vacuum Process Products

RECLAIMED RUBBER

Better processing and better reclaims have always been our aim.

Our new synthetic reclaims are also meeting with the approval of the industry.

Our reputation for uniformity and fine finish at competitive prices is well known wherever reclaims are used.

PEQUANOC RUBBER CO.

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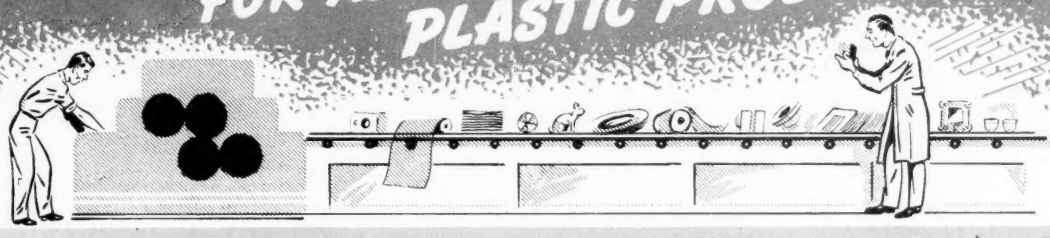

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Technical Bulletin No. 41

on the Compounding of GR-S with Substantial Loadings of ZINC OXIDE

Butadiene—Dichlorostyrene Polymers with 100 Parts of Zinc Oxide

Results with the chlorostyrene polymers have been reported in Technical Bulletins 32 and 35. Interest still continues in these experimental modifications of GR-S on account of improved properties with mineral pigments. The office of Rubber Reserve has recently had prepared at the Government Laboratories at Akron, Ohio two modifications of the dichlorostyrene type which are defined as follows: *"XP-40A is a 70/30 butadiene-dichlorostyrene copolymer having a 57 Mooney, prepared by using the XP-8 recipe (activated and low temperature polymerization)." "XP-42 is a 71/29 butadiene-dichlorostyrene copolymer having a 56 Mooney and prepared according to the standard GR-S formula."*

NOTE: These polymers will not be in regular production in the near future, although limited samples could be made available for evaluation upon request to the Research and Development Division, Office of Rubber Reserve, Reconstruction Finance Corporation, Washington 25, D.C.

COMPOUND NO. 41

Polymer	100.0
Sulfur	3.0
MBT	2.0
D.P.G.	0.1
Coumarone-indene Resin	7.5
E.L.C. Magnesia	5.0
ZINC OXIDE	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
XP-40A										
2	2520	870	125	170	250	380	.32	46	—	—
4	2650	770	200	275	395	635	.37	49	80	40
7.5	2940	730	240	320	485	810	.42	50	79	40
15	2960	670	280	400	600	1040	.43	51	77	40
30	2700	620	285	450	690	1310	.40	53	77	39
45	2780	615	285	445	685	1290	.37	54	80	40
60	2620	600	285	445	810	1330	.35	54	86	41
90	2620	595	315	475	790	1350	.32	54	82	45
XP-42										
2	2060	830	130	215	300	470	.34	45	—	—
4	1940	695	235	350	505	775	.34	48	78	41
7.5	2180	680	240	315	515	870	.42	50	76	42
15	2140	620	285	360	645	1090	.43	52	74	40
30	2040	575	280	440	680	1280	.40	53	77	36
45	2060	570	240	445	725	1330	.40	53	77	36
60	1940	560	285	485	765	1370	.36	53	74	37
90	1530	525	285	445	725	1290	.29	53	76	35

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indention in mm.	Per Cent Rebound	Hardness: Shore	Rex	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70° C. Inches Failure: 400 Cyc.	1500 Cyc.
XP-40A											
60	7.51	60.9	52	55	24.3	15′—5.3	22.1	13.6	16.0	.15	.36
XP-42											
60	7.49	60.2	52	55	25.4	55′—27.3	61.0 (At 15′ 37.0)	16.1	37.2	.16	.30

*Test Conditions: 143 Lb. Load. 0.175" Stroke. 100° C. Oven Temp.

THE RESULTS with XP-40A are generally outstanding with respect to stress-strain (approaching closely the results with a similar loading in natural rubber), tear resistance, pendulum rebound and heat generation. Both polymers exhibited good milling properties and had a rating of 2 according to the duPont scale for millability, originally developed for Neoprene. XP-40A was emulsified with low soap resulting in low acid in the finished polymer. This appears to be essential in order to obtain the best results with Zinc Oxide.

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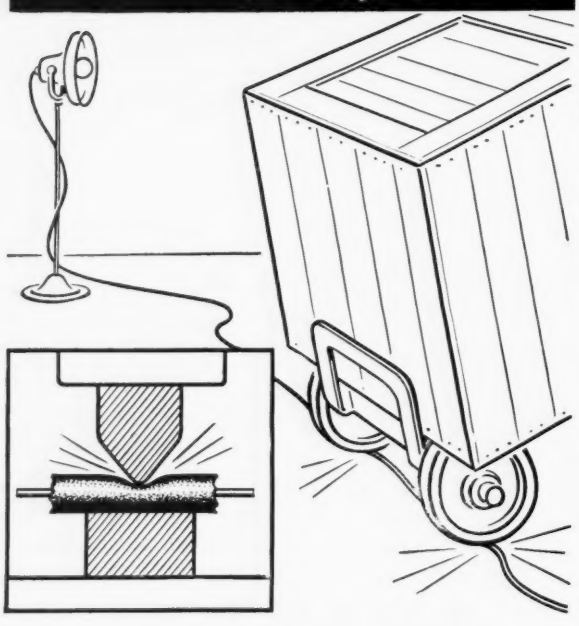

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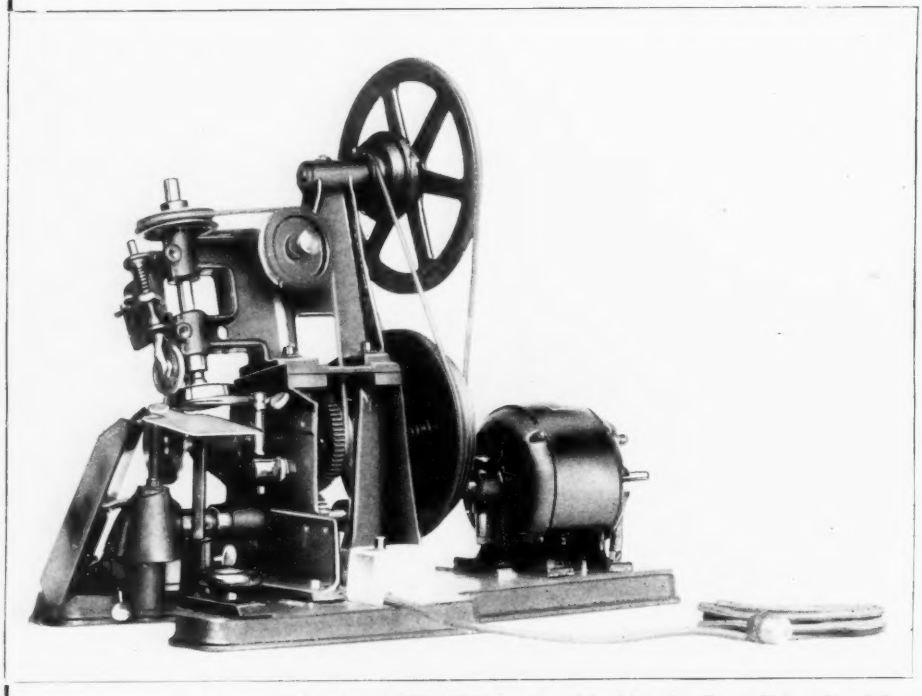

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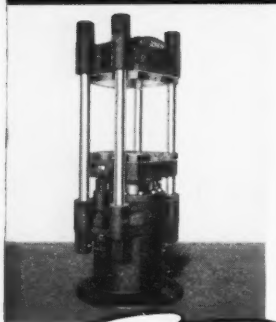

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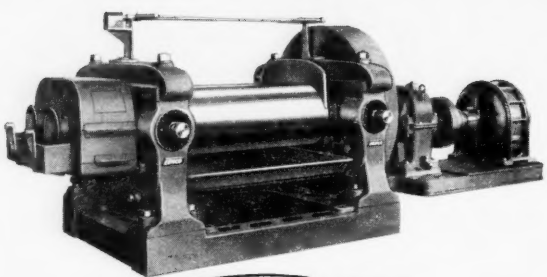

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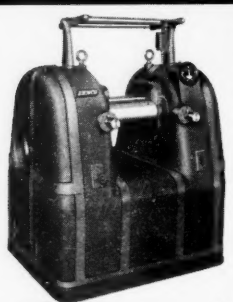

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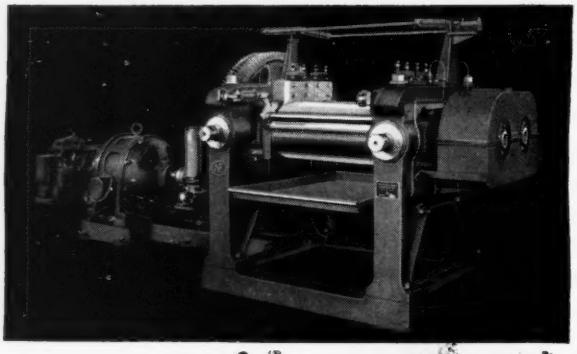

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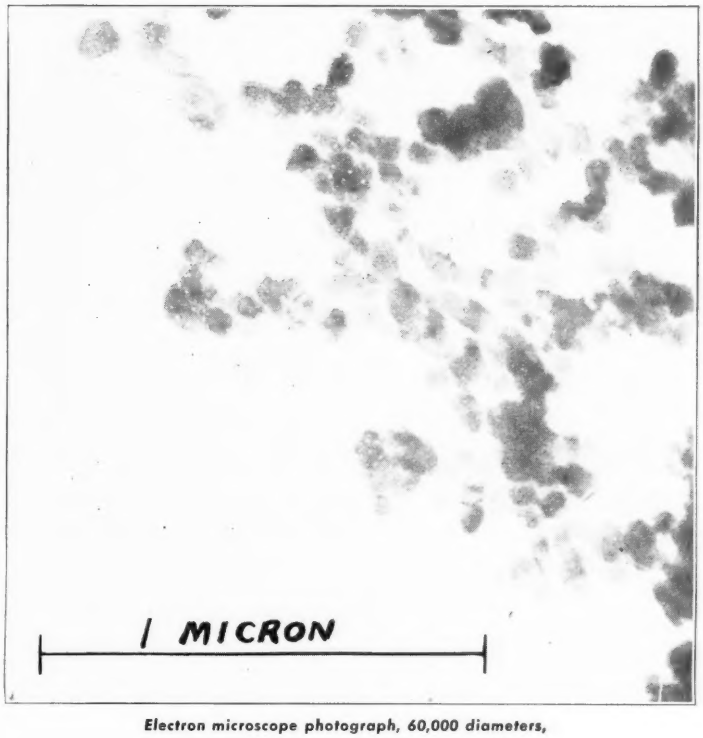

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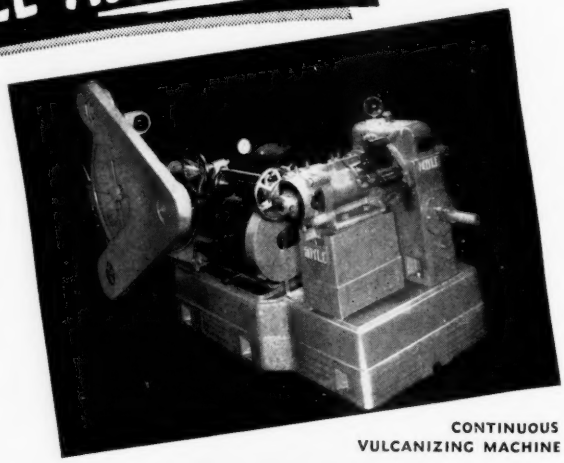

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Carl J. Wright.

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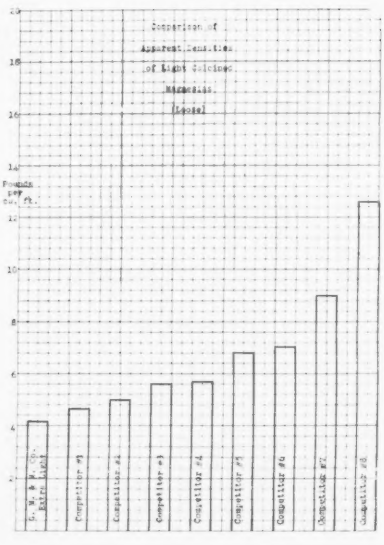

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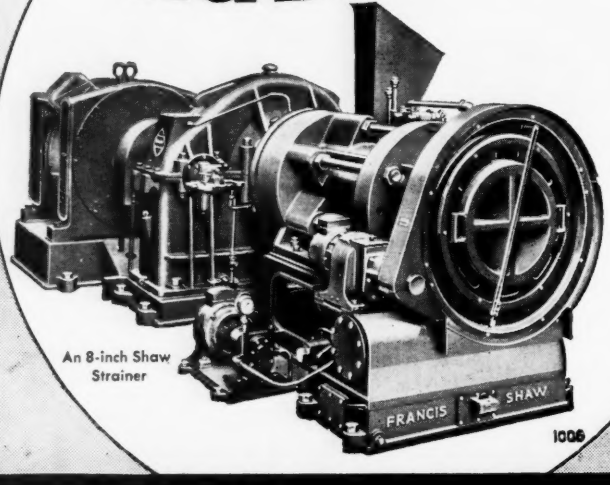

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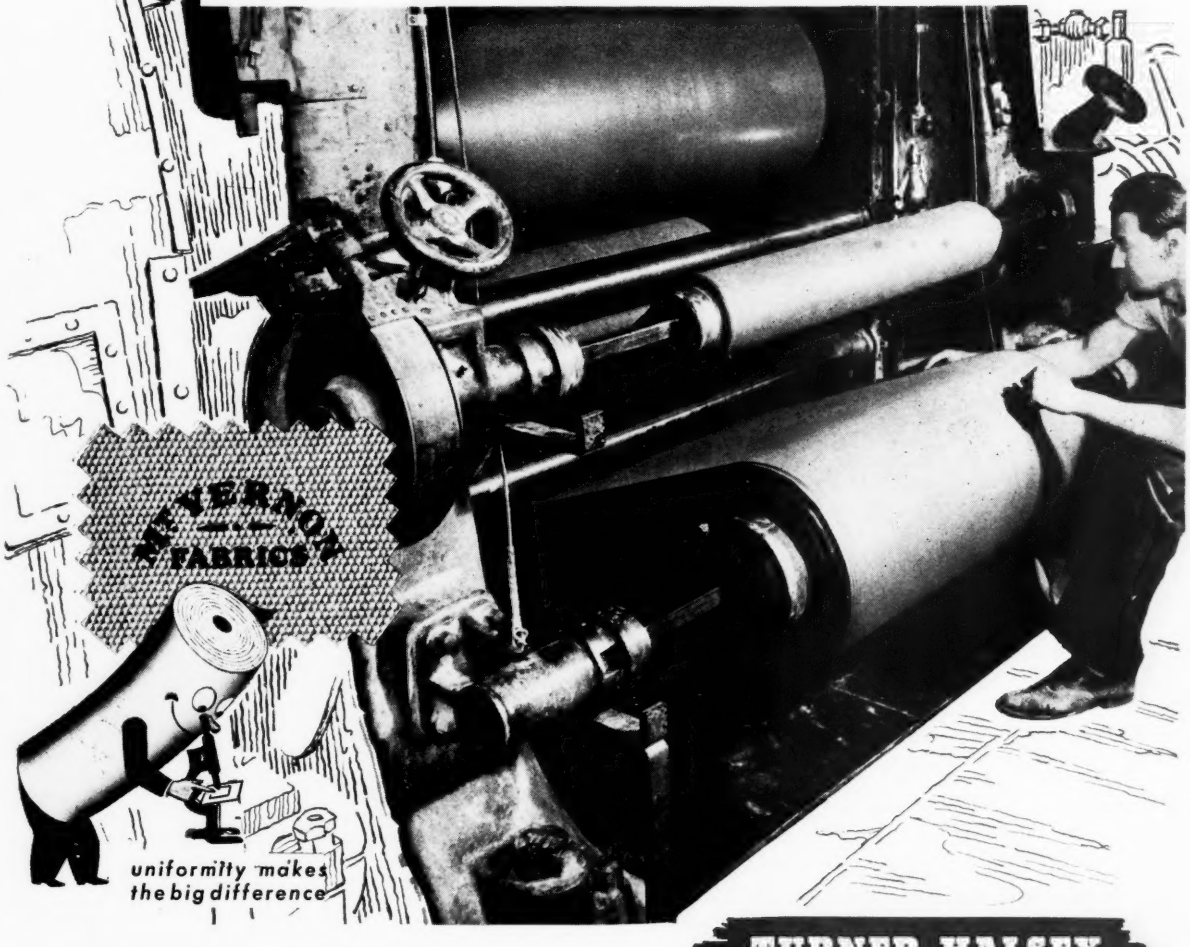

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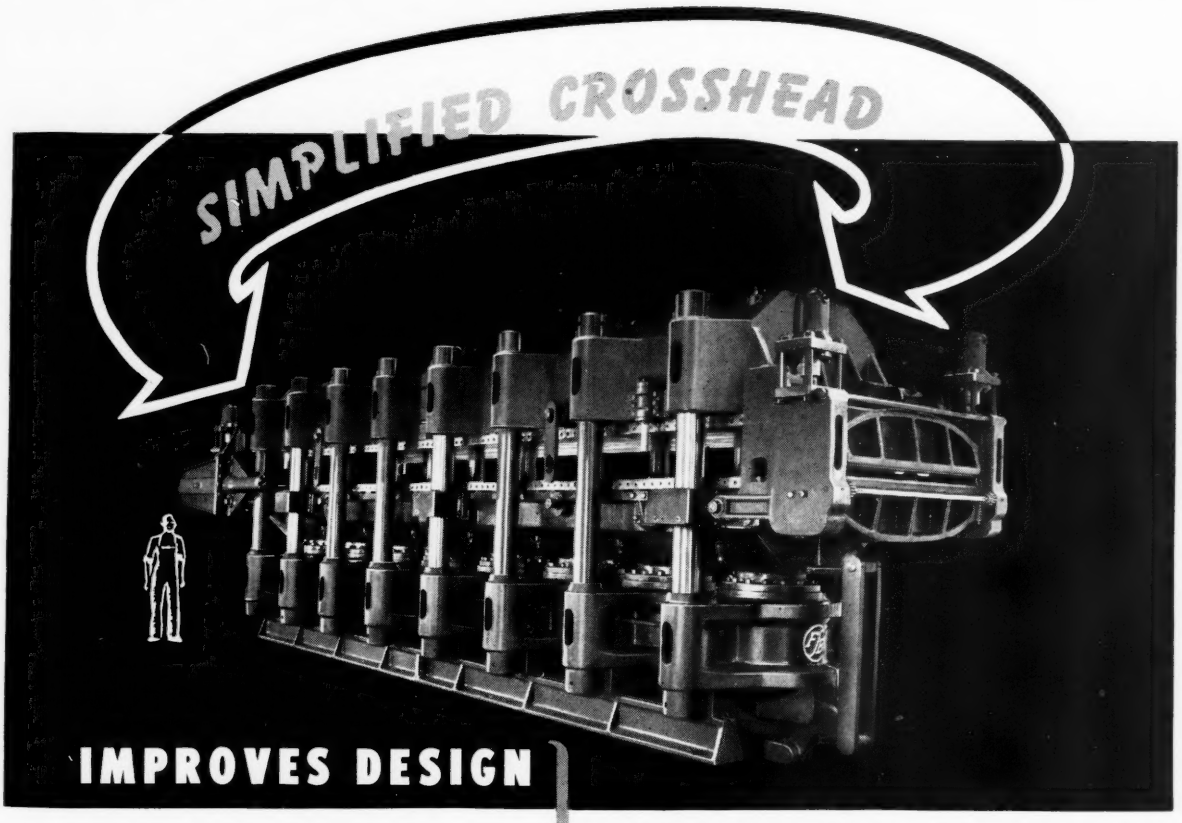

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Silicone Rubber—New Properties for Design Engineers[1]

George S. Irby, Jr.,[2] Wyman Goss,[2] and James J. Pyle[2]

SILICONE rubber is a new synthetic elastomer which exhibits exceptional properties of thermal stability. The physical, chemical, and electrical properties of this material, as affected by high and low temperatures, have been studied. The results of this study, together with fabrication techniques and proven applications, are compared to show where silicone rubber may be of best use to the design engineer.

As a result of rapid developments in the field of organosilicon chemistry during the last few years, a whole new class of high polymeric materials has been made available to product and design engineers. This group includes such products as silicone rubber, oils, resins, greases, and water-repellant films. The members of the silicone family naturally vary as to properties and potential applications; however they all offer an outstanding characteristic—thermal stability from —70° F. to +500° F. Silicone rubber, the elastomeric member of this family, shows its temperature stability by not only retaining its flexibility, resiliency, and surface hardness over this entire temperature range, but also by resistance to long periods of heat aging. The availability of an elastomer with these heat resistant properties immediately suggests new design possibilities where elastic materials are needed in equipment operating at elevated temperatures. However mistaken conceptions of this material will arise if it is merely substituted for conventional rubbers in existing designs. The properties of silicone rubber do not match those of natural or synthetic rubber at room temperature. On the other hand at operating temperatures of —70° F. or at +500° F. the properties of other elastomers generally fall far short of silicone rubber. It is the purpose of this article to discuss these properties with related engineering applications to show where silicone rubber can and cannot be used.

[1]Presented before the Rubber & Plastics Division, A. S. M. E., Atlantic City, N. J., Dec. 4, 1947.
[2]Plastics Division, General Electric Co., 1 Plastics Ave., Pittsfield, Mass.

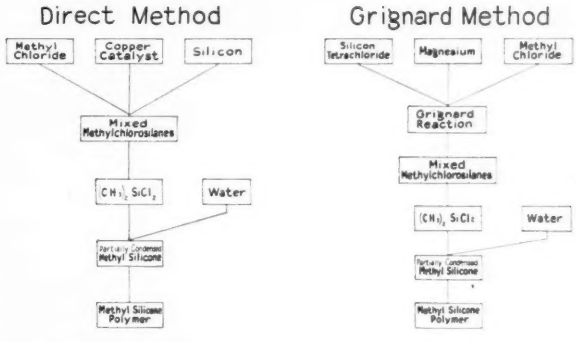


Fig. 1. Commercial Production of Dimethyl Silicone Polymer

Formation and Processing

Silicone rubber is produced by compounding a silicone gum with suitable fillers and then vulcanizing or cross-linking the compounded rubber stock. To produce the gum, however, a considerable amount of chemistry is involved.

The gum is produced commercially in two different ways (Figure 1). Through a direct reaction, methyl chloride and silicon are combined in the presence of copper as a catalyst to form a mixture of methyl chlorosilanes. This mixture is fractionated to obtain dimethyl dichlorosilane, which in turn is hydrolyzed to produce a silicone oil. This partially condensed methyl silicone oil is then further polymerized to produce the final gum product.

In the Grignard process silicon tetrachloride, methyl chloride, and magnesium are starting reactants. Through a Grignard reaction a mixture of methyl chlorosilanes is formed, and from this point the procedure can be the same as in the direct process to produce a methyl silicone gum.

A molecule of silicone gum, compared to one of natural rubber (Figure 2), illustrates the difference between the two substances. The fundamental structure of the natural rubber molecule is a carbon to carbon linkage; while in the silicone molecule a silicon-oxygen linkage is the basic structure. It is this particular structure that imbues silicone rubber with its unique properties of thermal stability.

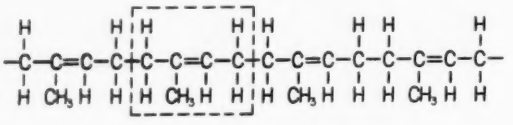
From the gum, compounded rubber stocks are produced by milling or Banburying with such fillers as calcium carbonate, lithopone, titania, and various silica fillers. Carbon black has not been used to a great extent

in silicone rubber to date because of vulcanization difficulties when this particular filler is used. The hardness of the stock is a function of the type of filler, filler gum ratio, and degree of vulcanization. The filler to gum ratio can be varied extensively to secure desired properties. Excellent rubbers can be compounded using filler to gum ratios of as high as 2 to 1.

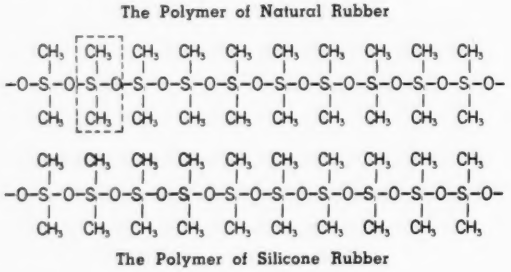
It has not been found possible to vulcanize silicone rubber by means of sulfur or sulfur containing compounds. By the use of certain organic peroxides, however, successful vulcanization is accomplished. Silicone rubber stocks can be molded in conventional rubber molds using a mold cycle of from three to 10 minutes and a mold temperature of 125-150° C.

After the silicone rubber stock has been fabricated into finished parts by either molding or extrusion, a bake cycle of from 50 to 60 hours at 200° C. is necessary to bring out its optimum properties.

Fig. 2



The Polymer of Natural Rubber



The Polymer of Silicone Rubber

Physical Properties

A detailed examination of the properties of the rubber will show best this material's stability (Table 1). In this chart are listed the properties of four silicone rubber compounds. These compounds differ as to formulation and range in hardness from 45 to 85. The original mechanical properties are characterized by low tensile strength, moderate elongation, and low tear resistance. However, after 500 hours at 200° C. of heat aging, the mechanical properties undergo no great change. Flexibility is retained; tensile has suffered no change, and weight loss is low. At 200° C. natural and synthetic rubbers decompose chemically after 10-15 hours. At —60° C. the flexibility of silicone rubber is maintained with no cracking or crazing.

Compression set tests on natural and synthetic rubbers are normally run at 70° C. At this temperature the compression set of silicone rubber averages 10 to 15%. When the material is compressed 30% and held for six hours at 150° C., compression set values average 25 to 40%, i.e., the rubber regains 60 to 75% of the amount compressed.

While it can be easily understood that there would be many misgivings as to the strength of the material at room temperature, compare the tensile strength of silicone rubber with two synthetic varieties at the operating range of 200° C., as shown in Figure 3. Both synthetic elastomers have decreased in tensile 90% inside of 60 minutes and both suffered chemical decomposition in 15 hours. The three silicone rubber formulations retained their tensile and flexibility over a period of 800 hours in this particular test.

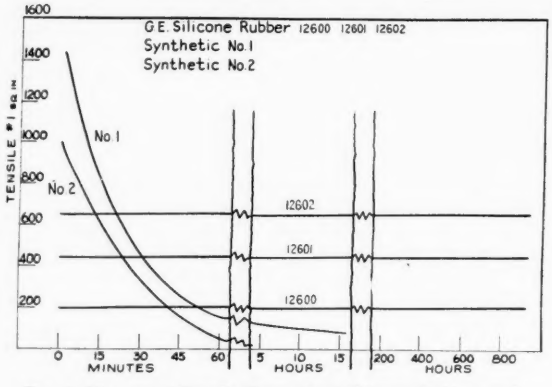


Fig. 3. Change of Tensile Strength of Silicone Rubber and Two Synthetic Rubbers When Aged at 200° C.

TABLE 1. PHYSICAL PROPERTIES OF SILICONE RUBBER

Compound	12600	12601	12602	12603
Original Properties				
Hardness (Shore "A" durometer)	45-55	55-65	65-75	75-85
Tensile strength, p.s.i.	200	450	650	500
Elongation, %	200	150	110	100
Tear resistance, lbs./in.	35	45	45	35
After 500 hrs. at 200° C. (392° F.)				
Hardness change	+15-20	+15-20	+8-10	+6-8
Tensile, % change	+20	+5	±0	±0
Elongation, % change	−50	−50	−25	−25
Weight loss, %	2-3	2-3	2-3	2-3
Low Temperature Resistance				
Flex test after 6 hrs. at (—) 60° C. (−)76° F.	no cracks or crazing	no cracks or crazing	no cracks or crazing	no cracks or crazing
Compression Set				
Compression 30%:				
22 hrs. at 70° C. (158° F.)	10%	15%	10%	10%
6 hrs. at 150° C. (302° F.)	30%	40%	25%	25%

The stability of silicone rubber formulations as to hardness and elasticity is shown by the following tests carried out by measuring with a Shore "A" durometer the hardness over a range of temperatures from —60° C. to 200° C. (Figure 4). The four silicone formulations showed less than 15% change; while the curve of two synthetic varieties run in comparison shows a change of 70 to 80%.

As to where the properties of silicone rubber may be put to use, the field of gaskets and packings immediately suggests itself. In the design of seals, engineers are more and more looking with favor on molded elastomeric materials. The properties of silicone rubber which offer flexibility and long life at elevated temperatures make this material of great use in various designs.

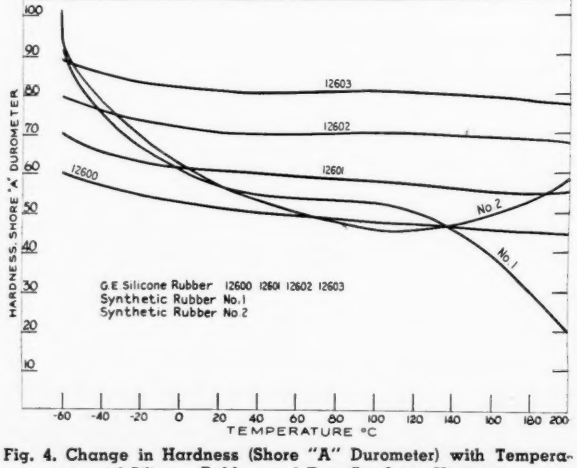


Fig. 4. Change in Hardness (Shore "A" Durometer) with Temperature of Silicone Rubber and Two Synthetic Varieties

Fig. 5. Silicone Rubber Gasket Sealing a Large Area between Two Units of a Drying Oven

Principal among these is the use of this material as a gasket to provide static seals where hot air under pressure is being transferred. The following designs have proved successful in this application.

In a 16-cylinder diesel engine the junction of each cylinder and supercharger connection was sealed with a five-inch diameter molded silicone gasket of a rectangular cross-section. Operating conditions were 300° F. and 15 p.s.i. air pressure. The heat aging of the silicone rubber in this case eliminated frequent replacement of the gasket.

In early-model aircraft turbo superchargers a large "O" ring gasket was necessary for proper sealing action. Operating conditions here were 400° F. A 3/16-inch extruded silicone rubber rod bonded at the ends to form an "O" ring provided successful gasketing action.

In a particular drying oven (Figure 5) a large area had to be sealed between the water scrubber and the drying channel. Here again the temperature was above 300° F., and the air contained several solvents. Effective sealing action was obtained by using a large "O" ring gasket with a 3/8-inch cross-section.

"O" ring packings are an excellent design when silicone rubber is considered as a gasket material because of the fact that the packing friction on "O" rings is very low. Then, too, in the production of large-diameter "O" rings, circular extrusions are simply bonded together, thus eliminating costly molds.

V-rings, or chevron packings, can be molded from silicone rubber stock and used to increase the operating temperature of oil seals (Figure 6). Well-housed V-packings of silicone rubber have successfully provided a seal around a high-speed shaft where the oil temperature was 300° to 400° F. Shaft seals of another design have been produced by molding the packing inside of a metal ring housing.

In general, silicone rubber is not recommended for packing designs where a large surface area of the packing itself is exposed to a rotating shaft. Nor is it recommended for packing in contact with steam. But where seals are necessary in mechanical systems involving various lubricating oils or air at elevated temperatures, properly designed silicone rubber gaskets and seals give exceptional service.

In the following design (Figure 7) silicone rubber is used to provide a flexible cushion for a metal strip that is to operate at an elevated temperature. An extruded flat section of rubber is bonded to the metal with a special adhesive. If, in such a case, abrasion is a problem, silicone-coated glass cloth can be bonded to the outer surface of the rubber. Thus the desired property of flexibility after heat aging is attained and mechanical weakness eliminated.

Fig. 6. Silicone Rubber "V" Packing for an Oil Seal

Fig. 7. Silicone Rubber Bonded to a Metal Strip with a Glass Cloth Facing

The surface of the fully cured rubber is entirely free of tack. There is no tendency for it to stick or adhere to metallic or non-metallic surfaces. This lack of adhesion extends over the entire operating range of the rubber, which point is not true for other elastomers. This property has been taken advantage of in packing designs where adhesion has heretofore been a major problem. In the discharge valve seat of an electric hot water heater, high temperatures and no adhesion were the problems. A silicone rubber valve seat met both requirements satisfactorily.

Chemical Properties

The exact effect of solvent action and chemical corrosion is difficult to determine by purely laboratory means. Immersion tests (Table 2) do not tell the entire story. Especially in the application of gaskets and seals, the surface area of exposure, the temperature at the point of exposure, the compressive force on the gasketing material all have a direct bearing on the degree of corrosion and swelling. In general, hydraulic fluids, lubricating oils, various polar solvents, dilute acids, and alkalies, and concentrated salt solution cause very little swelling action on silicone rubber at room temperatures. Concentrated acids and alkalies have a very corrosive action on the rubber, and non-polar solvents impart high swelling.

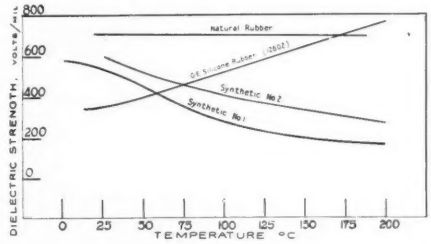


Fig. 8. Dielectric Strength *vs.* Temperature of Silicone Rubber, Natural Rubber, and Two Synthetic Varieties

TABLE 2. CHEMICAL RESISTANCE OF SILICONE RUBBER
ASTM D543-43

Reagent	12600		12601		12602		12603	
	% Chge. Wt.	% Chge. Vol.	% Chge. Wt.	% Chge. Vol.	% Chge. Wt.	% Chge. Vol.	% Chge. Wt.	% Chge. Vol.
Water	+2.4	+7	+0.6	+1	+0.6	0	+0.59	0
At 100° C.	+7.1	+14	+6.8	+15	+3.2	0	+3.0	0
H_2SO_4 conc.	*	*	*	*	*	*	*	*
HCl conc.	+11.7	+42	+24.5	+43	+2.4	+3	+2.0	+8
HNO_3 conc.	*	*	+82.3	+118	+7.3	+8	+6.4	+8
NH_4OH conc.	+4.9	+13	+5.8	+11	+2.1	0	+2.7	0
KOH 50%	*	*	*	*	−3.0	+1	−4.5	−5
H_2SO_4 10%	+16.0	+37	+18.0	+38	+0.9	0	+0.5	0
NH_4OH 10%	+4.5	+13	+4.4	+10	+1.7	0	+1.7	0
NaCl conc.	+0.2	+8	+0.1	0	−0.1	−1	+0.1	+1
Mineral oil at 25° C.	+2.5	+2	+2.5	+3	+3.0	+4	+2.5	+2
168° C.	*	*	..	+29	..	+38	..	+42
Castor oil	+3.0	0	0	0	0	+1	+0.1	+1
Linseed oil	+3.8	+3	+0.3	−1	−0.4	+3	+0.4	+2
Glycerine	+0.5	0	0	−1	+0.3	+1	0	0
Alcohol	..	+5	..	+5	..	+5	..	+5
Acetone	..	+25	..	+25	..	+25	..	+25
Benzene	..	+160	..	+150	..	+85	..	+85
Toluene	..	+200	..	+200	..	+85	..	+85

*Dissolved.

In gasketing applications involving the use of hydraulic fluids, lubricating oils, and solvents at elevated temperatures, it is recommended that the silicone gasket have as little surface area exposed to the fluids as possible. An "O" ring design confined in a chamber under pressure to effect a seal has worked well in cost cases. Silicone rubber packings with a square or rectangular cross-section have also worked well.

An "O" ring design of silicone rubber has effectively provided an oil and air vapor seal on the TG-180 jet engine. The temperature at the point of seal was 350° F. to 400° F. No swelling was observed from the effects of the oil vapor, and the gasket could be reused.

The harder silicone rubber stocks with silica as a filler are much more resistant to all chemical action and are recommended for use where corrosion and swelling are problems. Steam has a very corrosive action on silicone rubber when the rubber is totally surrounded by steam. Tests have been run involving low pressure steam (20 lbs./sq. in.), and it was found that the silicone polymer was leached out of the rubber. A 5-10 mil surface area of the rubber samples lost 35% of their polymer in 500 hours. However silicone rubber parts placed in metal housings with only a small surface area exposed suffered decomposition only at the point of contact with the steam. This point opens the possibility that if elastomeric gaskets are needed for sealing at elevated temperatures where steam is present, a well-housed silicone gasket may well serve the job.

Electrical Properties

In Table 3 is listed a summary of the electrical properties of four grades of silicone rubber. From consideration of the dielectric constant and power factor values, it can be seen that the harder stocks, with silica as a filler, have the best electrical properties. Of particular interest is the increasing dielectric strength values with increasing temperature.

TABLE 3. ELECTRICAL PROPERTIES OF SILICONE RUBBER

Compound	12600	12601	12602	12603
Dielectric strength s/s	300	260	380	400
vpm at 25° C. s/t	320	280	450	450
Dielectric strength s/s	300	250	510	380
vpm at 100° C. s/t	350	330	560	500
Dielectric strength s/s	350	330	620	500
vpm at 150° C. s/t	400	340	680	500
Power factor, 1 Mc, dry	.0007	005	.003	.004
3 days wet	.011	.017	.004	.005
7 days wet	.014	.018	.005	.005
14 days wet	.016	.018	.005	.005
Dielectric constant, 1 Mc, dry	3.8	7.4	3.1	3.1
3 days wet	4.4	8.6	3.2	3.2
7 days wet	4.5	8.8	3.2	3.2
14 days wet	4.9	8.9	3.2	3.3
Volume resistivity, megohms/cc	$1.5x10^5$	$1.5x10^5$	$1.5x10^5$	$1.5x10^5$

This is shown more graphically in Figure 8 where the dielectric strength values of silicone rubber, natural rubber, and two synthetic varieties are compared over a temperature range of from room temperature to 200° C. The natural rubber remains fairly constant at 700 v.p.m.; the two synthetic varieties decrease rapidly from 600 to 200 v.p.m.; while the silicone rubber increases from 400 to 600 v.p.m.

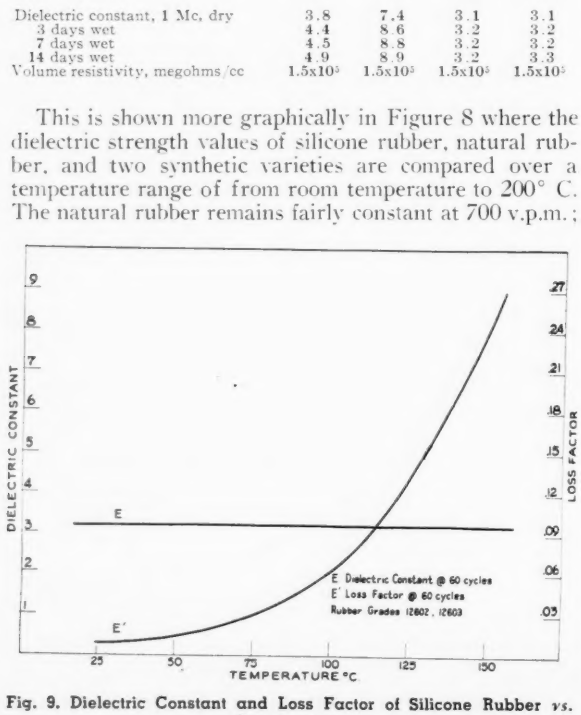


Fig. 9. Dielectric Constant and Loss Factor of Silicone Rubber *vs.* Temperature

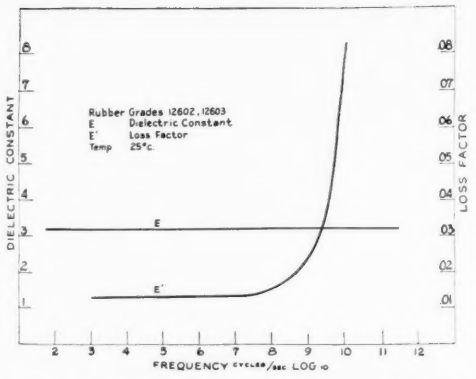


Fig. 10. Dielectric Constant and Loss Factor of Silicone Rubber as a Function of Frequency

When dielectric constant and loss factor values at 60 cycles are compared over a range of temperatures, the dielectric constant remains constant at 3.2, but the loss factor increases with increasing temperature from 0.01 at 25° C. to 0.24 at 150° C. (Figure 9). Dielectric constant and loss factor values were determined over a range of frequencies, and here again the dielectric constant remained unchanged while the loss factor rose rapidly after 1,000 megacycles (Figure 10).

In all electrical applications, ozone resistance is important. Silicone rubber samples have stood up well when exposed to low concentrations of ozone.

A combination of properties is taken advantage of in the use of silicone rubber as capacitor bushings. Good dielectric strength is of prime importance coupled with the fact that the rubber containing no plasticizer does not contaminate the pyranol in the capacitor. The low compression-set characteristics provide a permanent seal, and the design in general lends itself to assembly-line production.

The insulation properties and those of heat stability can also be put to use when silicone rubber is used as a wire coating material. The coating of wire and cable with silicone rubber has been under investigation for some time with respect to formulation of the rubber and proper fabrication. At the present time silicone coated wire can be produced and has been used successfully on motor lead wires and electrical cable where temperature was a problem. Glass braid can be woven over the rubber coated wire to improve the abrasion resistance of the rubber.

Fabrication

The fabrication of finished parts from the compounded silicone stocks can be accomplished in many ways, and this versatility greatly simplifies design problems. The most rapid fabrication method from a production standpoint is extrusion. By this process a variety of shapes and sizes can be produced to tolerances of ±0.005-inch.

Molded parts can be produced in conventional rubber molds making use of compression, transfer, or injection molding techniques. Optimum mold pressures are low, 100-500 p.s.i., and optimum mold temperatures are from 125-150° C.

Coating of various cloths can be accomplished by use of conventional knife or dip coating machines. When glass cloth is coated with silicone rubber, the resulting product is a flexible rubberized cloth that has been used

(*Continued on page* 616)

The Use of High Styrene Resins in Non-Marking Soles and Heels[1]

M. E. Jones[2] and D. M. Pratt[2]

MODIFIED styrene resins identified as "S" and "S-1" were introduced in 1942 by the Marbon Corp. At the outset they were used as reinforcing agents and tubing aids for GR-S in the wire and cable industry, and during the war one of the major outlets for these resins was "Spiral 4" cable. More recently, when restrictions were lifted, other major uses were developed—among these, in shoe soles and heels.

During the past two or three years, owing to the shortage of leather and its high price, sole and heel manufacturers had an opportunity to develop a leather substitute based on GR-S reinforced with high styrene resins. Through the use of these resins it is possible to compound sole and heel stocks possessing wearing qualities superior to leather. The main objection to rubber soles and heels in the past has been the "rubbery" feel which the public has associated with leather "substitutes," but with high styrene resin-rubber compounds a "boardy or leathery" characteristic may be obtained, and high water resistance and good aging properties achieved at the same time.

Such a good job has been done by the sole and heel compounders that practically all the good qualities of leather have been reproduced in the high styrene resin-rubber soles and heels, and they now surpass leather insofar as wearing qualities, water resistance, and non-slip features are concerned. As a result, it is quite possible that the public will continue to demand this new type of shoe soles and heels even when leather becomes more readily available and sells at a lower price. Many feel that the stigma of leather "substitute" has been removed and that the styrene resin-rubber shoe soles and heels have thoroughly demonstrated their ability to compete with leather for these uses.

Properties of "S" and "S-1" Resins

Marbon "S" and "S-1" resins act as heat plasticizers and processing aids as well as reinforcing agents when used in either natural or synthetic rubbers. These resins contain a certain amount of active unsaturation which should be considered when they are used as a direct replacement for rubber in connection with the amount of vulcanizing ingredients required. The difference between the "S" and "S-1" resin is in the softening point range and in the electrical properties; the "S-1" resin is the softer and possesses the better electrical properties.

Figure 1 shows the effect of vulcanizing agents on the shrinkage of these resins when used alone after molding and curing for 15 minutes at 320° F. All samples, in the form of six- by six-inch slabs, were removed from the hot mold immediately at the end of the curing cycle. Stock A contained resin, activator, accelerator, and sulfur and remained smooth and displayed very little shrinkage after cooling. Stock B contained resin, sulfur, and activator and after cooling was a little rough and showed some shrinkage. Stock C contained resin and zinc oxide only, and roughness and shrinkage are more evident. Stock D is resin "S" alone, and the shrinkage and surface roughness are pronounced.

Properties of Rubber-Resin Stocks

With Marbon "S" and "S-1" resins it is possible to compound sole and heel stocks in the Shore hardness range of from 90 to 100 without the danger of the stock scorching and crumbling during processing, a difficulty encountered when compounds of this hardness are made using inorganic fillers. These resins also aid in decreasing the nerve of both natural and synthetic rubbers on the mill and provide a tight, smooth rolling bank almost at once. The speed and ease of milling are increased, and the rate of incorporation of other compounding ingredients is accelerated. These resins, of course, work equally well in Banbury mixing.

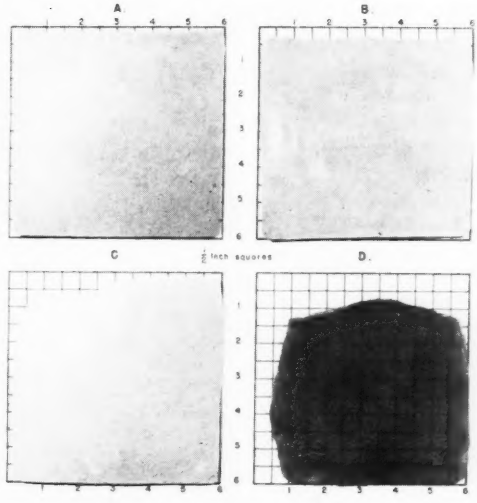


Fig. 1. Shrinkage of Marbon "S" and "S-1" Resins after Molding with and without Vulcanizing Agents

The high styrene resin-rubber stocks flow easily and uniformly in the molds, and this factor is of great importance because it permits the compound to work itself easily around washer inserts in heels and safety non-slip cores in both heels and soles.

Table 1 gives typical high-grade, light tan, non-marking shoe sole, heel, and tap compounds. In addition, a non-curing resin plasticizer (Piccolyte S-100) was used in these compounds with good results as far as heat aging characteristics are concerned. Compounds containing "S" and "S-1" resins have the advantage of decreased shrinkage of the uncured stock. In the compounds in Table 1 the shrinkage without benefit of resin "S" was 29%; while with the replacement of 40 parts of the GR-S with this resin, the shrinkage decreased to 9.2% (Stock J-86).

Figure 2 shows the improvement in modulus, tear resistance, and elongation obtained by the use of increasing amounts of resin "S" in sole and heel compounds. The tensile strength of these compounds was maintained well above 1,500 p.s.i. The replacement of the GR-S

[1]Presented before the New York Rubber Group, Oct. 24, 1947.
[2]Marbon Corp., Gary, Ind.

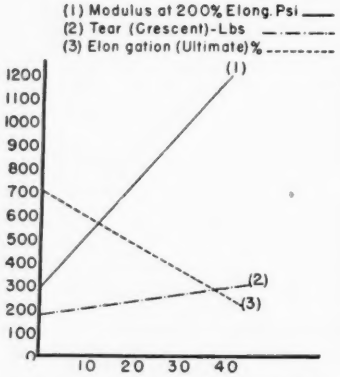


Fig. 2. Effect of Replacement of GR-S with High Styrene "S" Resin in Non-Marking Stock

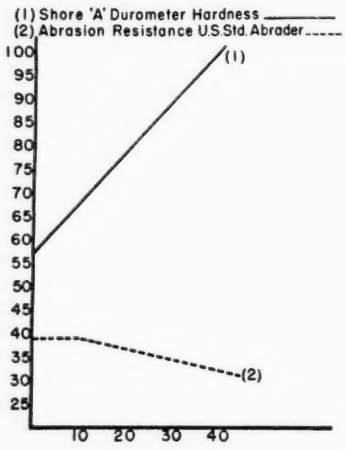


Fig. 3. Shore Hardness and Abrasion Resistance of Styrene Resin-Rubber Sole and Heel Stocks

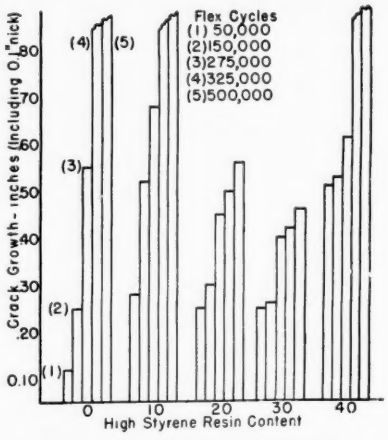


Fig. 4. Flex-Cracking Resistance of Styrene Resin-Rubber Sole and Heel Stocks (Oven Aged 24 hours at 212° F.)

with resin "S" increased the modulus at 200% elongation and improved the tear resistance. The elongation decreased, but is well above 300% at 90 to 95 Shore hardness.

TABLE 1. NON-MARKING SOLE AND HEEL FORMULAE

	J-82	J-83	J-84	J-85	J-86
GR-S	100	90	80	70	60
High styrene resin	0	10	20	30	40
p-Amino diphenyl	1				
Zinc oxide	5				
Yellow oxide	3				
Silene	75				
Ethylene glycol	1		Balance of formulae same as J-82		
Beta-pinene polymer (Piccolyte S-100)	5				
Paraffin	1				
Sulfur	2				
Benzothiazyl disulfide	1.5				
Copper diethyl dithiocarbamate	0.1				

Press cures—6, 9, 12 min. at 320° F.
Specific gravity (after cure)—1.3

The excellent abrasion resistance of styrene resin-rubber compounds is demonstrated in Figure 3 even though the hardness of the stocks was gradually increased from 57 to 98 Shore. It is this superior quality that has created a consumer demand for shoes with excellent wearing styrene resin-rubber roles rather than for shoes bearing popular trade names. In the same manner the shoe repair trade is finding customers demanding these types of soles, heels, and taps as replacements. The abrasion tests were run on a United States Bureau of Standards Abrader, which has been adopted by the shoe sole industry as standard test equipment.

The hardness, as recorded in Figure 3, indicates another important advantage gained from the use of high styrene resins. In these compounds the replacement of 30 parts of GR-S with resin "S" increased the hardness from 57 to 93 as measured with a Shore A durometer. We would like to point out that styrene resin-rubber stocks of 90 to 100 hardness have much lower specific gravity than equally hard stocks loaded with clays, etc. The specific gravity of the former is approximately 1.3; whereas the specific gravity of the stocks loaded with clay may be as high as 1.8 or 1.9. Hence the finished sole or heel containing the high styrene resin will be as much as 30% lighter by weight. Because of the lower specific gravity the cost of the stock reinforced with a high styrene resin could be 8¢ or 9¢ a pound greater than one loaded with clay, but the pound volume cost or the cost per sole would remain the same.

The equally important feature of the good aged flex-cracking resistance of stocks containing high styrene resins is shown in Figure 4. Samples were aged in an air oven for 24 hours at 212° F. and then tested on the Ross flexing machine.[3] This test and this machine are also standard with sole and heel manufacturers. The results reported in Figure 4 indicate that the flex-cracking resistance is maintained well above accepted standards despite the fact that the stocks have increased hardness and stiffness with good flexibility but without the "rubbery" feel. Special attention is directed to the compound containing 30 parts of resin "S." This stock is in the range of the hard-type soles; yet it has run in excess of 500,000 cycles with a crack-growth reading of 0.46-inch. A minimum of 10,000 flexures to failure of the test piece is an acceptable standard. It can be seen that such compounds can be loaded further with clays, flocs, etc., and still be within accepted standards for good commercial soles, heels, and taps.

Summary and Conclusions

In conclusion it may be said that high styrene resins such as Marbon "S" and "S-1" make possible the production of sole and heels stocks with the following characteristics:

(1) Easier processing with excellent flow properties during compounding and molding.
(2) Reduced shrinkage of uncured stocks.
(3) Unlimited color possibilities.
(4) Less cold flow after vulcanization.
(5) Improved tensile and tear resistance.
(6) High hardness and stiffness without brittleness.
(7) Exceptional resistance to low temperature and aged flex-cracking.
(8) High-grade, non-marking, and non-fading qualities.
(9) Waterproof and non-slipping properties.
(10) Low-gravity stocks resulting in light-weight finished products.
(11) Good sales appeal.
(12) Superior wearing qualities of the finished soles and heels.

"Blaw-Knox Resin Plants and Equipment." Bulletin No. 2087. Blaw-Knox Co., Pittsburgh, Pa. 24 pages. This publication describes and illustrates a variety of plants and equipment for the resin industry and allied fields.

[2] See India RUBBER WORLD, Jan., 1948, p. 489.

Effect of Storage and Temperature on Flexibility of Natural and Synthetic Rubbers[1]

John B. Gregory,[2] Irving Pockel,[3] and John F. Stiff[4]

PRIOR to World War II little thought had been given to possible failure of gas mask faceblanks and hose tubes at low temperatures as natural rubber was used, and no trouble with stiffening of the natural rubber masks due to low temperature use or storage had been reported. With the replacement of natural rubber by GR-M (neoprene) in 1943, it was recognized that the low temperature flexibility of this material might be a problem. An extensive investigation of the best formulations for cold resistance was therefore made, and the specifications were written so that formulae with the best low temperature properties would be used. Although GR-S (butadiene-styrene copolymer) and GR-M were both available for gas masks at that time, GR-M was selected since no method was then known for satisfactorily compounding GR-S to give the necessary physical characteristics at normal temperatures. However, in spite of all efforts to produce the best GR-M compound possible, a variety of complaints was received from the European Theater of Operations because of stiffening of the GR-M masks on long-time storage at the rather low temperatures encountered.

Gas masks may often be exposed to low temperatures for long periods before wearing if required for use in cold weather. Few investigators until recently,[5] however, have used sufficiently long exposure times in their test methods to study the effect of such long exposure. In the evaluation of compounds for rubber gas mask facepieces where the requirement is that the flexibility must remain relatively constant as the temperature changes in order that a proper fit may be obtained, the measurement of brittle point or T50 value is not applicable.[6, 7] Even the determination of modulus at 200% elongation at different temperatures is not suitable, as gas masks are so constructed that elongations of even 5% are seldom required. Moduli at lower elongations than 200% are not easily measured with standard equipment.

As Liska[8] has already given a good review of early work on the effect of low temperatures on elastomers, a detailed account will not be repeated here. We would, however, like to emphasize that care must be used in predicting performance of rubber stocks from brittle point data alone. For example, from the results of brittle point tests, Selker *et al*[6] state that natural rubber compounds containing no sulfur have a lower brittle point than compounds that have been vulcanized with sulfur and that the brittle point tends to rise with increases in combined sulfur content. Gibbons *et al*[7] have shown by use of the T50 test, however, that the resistance of rubber compounds to freezing increased with increases in per cent combined sulfur and in length of cure.

It seems to us that the occurrence of the two distinct changes when an elastomer such as natural rubber is cooled: namely true crystallization and second-order transition, explains anomalies such as the above. Liska[8] discusses these changes and states that they were demonstrated by investigators at the National Bureau of Standards. It might well be that owing to the rapid lowering of the temperature in the brittle point test[6] the internal viscosity of the rubber increases so rapidly that crystallization is inhibited and second-order changes predominate. The results obtained by the T50 test,[7] on the other hand, probably are more affected by the crystallization tendency. Sulfur vulcanization with its inhibiting effect on crystallization by cross-linking and its general stiffening of the system might well be expected to give the apparently contradictory results reported.

In order to study the properties of gas mask rubber, the CWS flexibility test for coated fabrics developed by O. Morningstar and I. Pockel at the CWS development laboratory was adapted to elastomer testing.

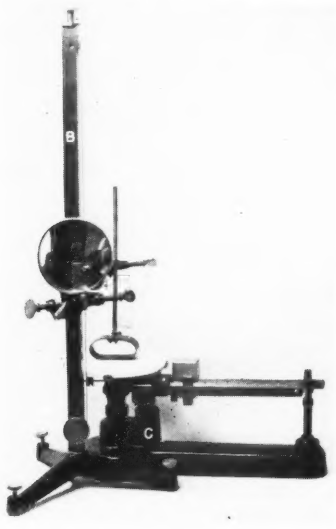


Fig. 1. Device for Determining Flexibility of Elastomers—(A) Ring Loop; (B) Cathetometer; (C) Balance

Directions for the Operation of the Test

The test, appartus for which is shown in Figure 1, consists essentially in loading and unloading a loop-shaped rubber sample in successive increments and measuring each resulting deformation of the sample. The sample, a one- by six-inch piece cut from an A.S.T.M. test slab[9] is bent and held in a clamp which in turn is

[1] Presented before the Division of Rubber Chemistry, A. C. S., Cleveland, O., May 28, 1947. The work reported in this article was done during the late war at the U. S. Army, Chemical Warfare Service Development Laboratory, Massachusetts Institute of Technology, Cambridge, Mass. The opinions or assertions in this paper are those of the authors and are not to be construed as official or reflecting the views of the Chemical Warfare Service or of the U. S. Army at large.

[2] Present address, Frederick S. Bacon Laboratories, Watertown, Mass.

[3] Present address, Cambridge Industries, Inc., Cambridge, Mass.

[4] Present address, Binney & Smith Co., New York, N. Y.

[5] Conant, Liska, *J. Applied Phys.*, 15, 767 (1944).
Greene, Loughborough, *Ibid.*, 16, 3 (1945).
Forman, *Ind. Eng. Chem.*, 36, 738 (1944).

[6] Selker, Winspear, Kemp, *Ibid.*, 34, 157 (1942)

[7] Gibbons, Gerke, Tingey, *Ind. Eng. Chem. (Anal Ed.)*, 5, 279 (1933).

[8] *Ind. Eng. Chem.*, 36, 40 (1944).

[9] A. S. T. M. Specification D 15-41, "A. S. T. M. Standards 1944 Supplement, Part III," p. 546. American Society for Testing Materials, Philadelphia (1944).

attached to the movable element of a cathetometer.[10] The apparatus is assembled so that the platform of a triple beam balance at zero load just touches the under side of the loop.

When the sliding weight on the balance arm is moved to a new position, not zero, the platform moves vertically upward and deforms the loop. By appropriately turning the cathetometer dial, the loop is compressed until the balance index again indicates level. Hence the stresses in the rubber sample are just sufficient to equal the external load shown on the balance arm. Figure 1 illustrates the apparatus with a ring under a slight load. The load is added in increments of about one-tenth the total necessary to collapse the loop almost completely. A balance is obtained, by means of the cathetometer, after each additional loading interval. The ring is then unloaded in successive increments balancing after each unloading.

To allow time for the slight creep or flow of the rubber, a one-half minute interval is allowed to elapse between each change in load and the corresponding reading of the cathetometer. The cathetometer is turned during this time interval so as to maintain instrument balance.

Figure 2 shows some typical data obtained by the above method plotted on rectangular coordinate paper. The average slope of the curve obtained in this way, which is a measure of the stiffness, is empirically designated as tangent alpha. The ratio of the areas under the loading and unloading curves determined by a planimeter multiplied by 100 give the % resilience of the sample.

Determination of Factor for Converting Tan Alpha to "S"

In order to determine a coefficient of flexibility of elastomers independent of the thickness of the sample a formula was devised for converting tan alpha to "S," where "S" is the coefficient of flexibility. Slabs of various thickness from representative neoprene and GR-S stocks were molded, and values of tangent alpha determined on specimens cut from these slabs and plotted on logarithmic paper against the thickness of the samples. Straight lines were obtained with a slope of 2.5 indicating that tangent alpha varied inversely with the 2.5 power of the thickness. Tangent alpha was therefore converted to S according to the following equation—$S = \frac{10^5 \text{ Tan } \alpha}{T^{2.5}}$, where S is the coefficient of flexibility characteristic of the material and T is the thickness in thousandths of an inch.

Effect of Using Short Samples on "S"

The effect on the "S" value of using strips shorter than six inches was determined on samples of various lengths cut from miscellaneous GR-M samples of varying flexibility. From these data a graph was obtained so that a true "S" could be attained on such samples (see Figure 3).

Experimental Details

The coefficient of flexibility or the % resilience of elastomers can be determined by this method at various temperatures by placing the sample to be tested and the test apparatus in a thermostatically controlled cold or hot room. The machine is somewhat bulky, and considerable manipulation of the sample is involved so that its use in small ovens or cold boxes is not recommended.

With the use of the above test method a study was made of the behavior of various gas mask faceblank compounds after prolonged storage at various temperatures.

Detailed formulations and physical properties of the rubber gas mask faceblank stocks selected are shown in Table 1. The stocks were compounded and A.S.T.M. slabs[9] molded using standard rubber laboratory equipment and technique.

Table 1. Formulae of Stocks Used in Study of Effect of Long-Time Exposure at Various Temperatures on Flexibility

Compound No.	1	2	3	4	5	6	7
GR-I	100						
GR-S		100					
GR-M			100	100			
Smoked sheet					61	100	100
Midwest reclaim 13A					90		
Stearic acid	1.5		1	1	1.68	2	2
Zinc oxide	5	5	12	12	18.6	5	5
Sym. di-beta-naphthyl-para-phenylenediamine					1.18	1	1
Flectol H					.77		
Salicylic acid					.13		
Mercaptobenzothiazole					1.86		
N-cyclohexyl-2-Benzo-thiazole sulfenamide					.17		
Di-ortho-tolylguanidine salt of dicatechol borate			0.35	0.35			
Sodium acetate			0.5	0.5			
Methylene-paratoluidine		0.5					
Di-ortho-tolylguanidine		0.2					
Zenite		0.8					
Zenite A						1	1
Dimethyl thiuram disulfide	1						
Selenium dithiocarbamate	1						
Red lead	0.5						
Extra-light magnesium oxide			1	1			
MPC black		20			4.34		
Calcene					107.5	142	25
FT black			15	15			
SRF black	70	16	30	30			
Phenyl alpha naphthyl amine			4	4			
Heliozone		2			0.53		
Paraffin	4		2	2	1.53		
Petrolatum			1	1			
Diotyl phthalate	12.5					1	1
Dibutyl sebacate	6.25						
Dicapryl phthalate			15	15			
Bayol D	6.25						
Lt. Circo Oil			5	5	10.4		
Mineral rubber		7.5					
Neophax A			10	10			
Naftolen R-100		6					
Sulphur	1.5	1.5		1	2.3	2	2
Cure	30 Min. at	10 Min. at	10 Min. at	10 Min. at	8 Min. at	8 Min. at	8 Min. at
Physical Properties	320° F.	320° F.	320° F.	320° F.	290° F.	290° F.	290° F.
Tensile P. S. I.	1553	1179	1924	1945	1415	2127	2937
Elongation (%)	723	878	802	770	540	686	718
Modulus at 200% p.s.i.	237	101	260	326	363	293	116
400% p.s.i.	465	286	881	966	891	866	426

Two one- by six-inch strips of each stock were stored at —20, +5, +35, and +150° F. and their respective flexibilities determined periodically at the storage temperatures, except in the case of those strips stored at 150° F.; the latter were conditioned at 70° F. for 24 hours before testing, and then tested at 70° F.

Figure 4, showing the plots of "S" value *vs.* time in storage at 150° F. for each stock, shows that all stocks increase in stiffness somewhat during the first two weeks of storage. The reclaim stock #5 is the worst, and the natural rubber stock #7 the best. As an "S" value of 70 was found to be about the upper limit for comfort, it is evident that the reclaim and 65% natural rubber are somewhat too stiff after storage. The GR-I compound also appears to be borderline.

The next figure, #5, shows the effect of various low temperatures on the GR-I stock. No difference in the flexibility of the stock could be detected initially or on long exposure at 70, 35, and 5° F. or initially at —20° F. During prolonged exposure at —20° F. a progressive change is, however, very marked. This is thought to indicate crystallization of the GR-I.

[10] An instrument for accurate measurement of small difference in height and consisting of a horizontal reading telescope or microscope movable along a vertical scale.
Other references:
Gardiner, *Rubber Chem. Tech.*, 14, 501 (1941).
Somerville, Cope, India Rubber World, 79, 64 (1928).

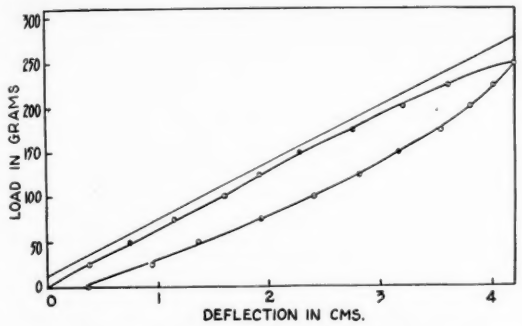


Fig. 2. Load *vs.* Deflection for a Loop of Natural Rubber—Tan Alpha=66; Average Thickness=0.064-inch; S=209; Resilience=74%

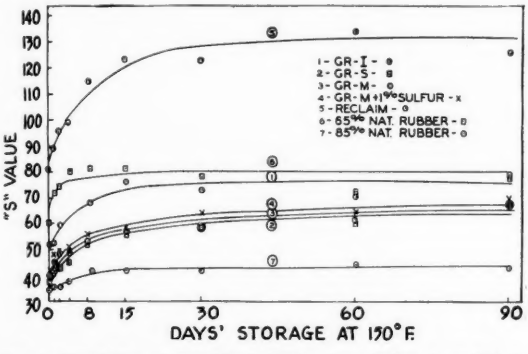


Fig. 4. Flexibility of Faceblank Stocks from Table 1 at 70° F. after Storage at 150° F. for Various Times

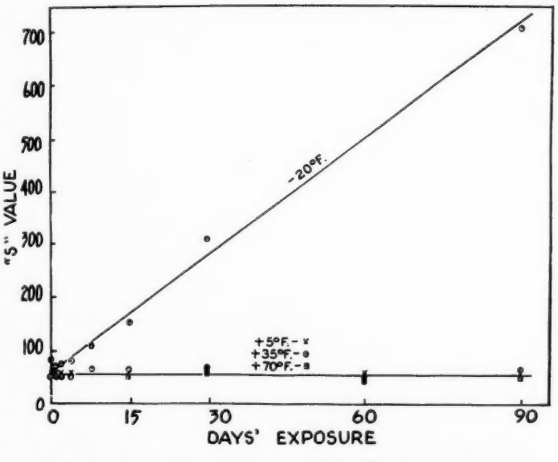


Fig. 5. Stiffening of GR-I Faceblank Stock #1, Table 1 *vs.* Days Exposure at Various Temperatures

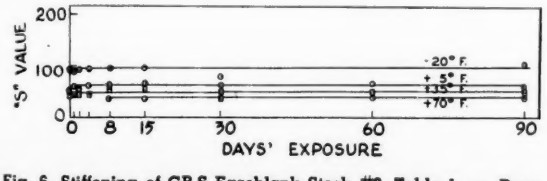


Fig. 6. Stiffening of GR-S Faceblank Stock #2, Table 1, *vs.* Days Exposure at Various Temperatures

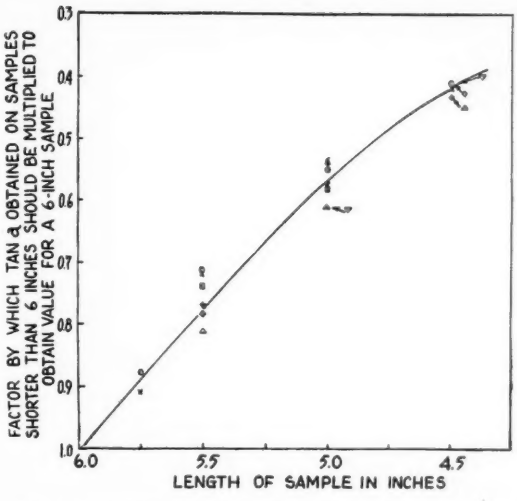

FACTOR BY WHICH TAN δ OBTAINED ON SAMPLES SHORTER THAN 6 INCHES SHOULD BE MULTIPLIED TO OBTAIN VALUE FOR A 6-INCH SAMPLE
LENGTH OF SAMPLE IN INCHES

Fig. 3. Corrections to Be Applied to Tan Alpha Obtained on Samples Shorter Than Six Inches

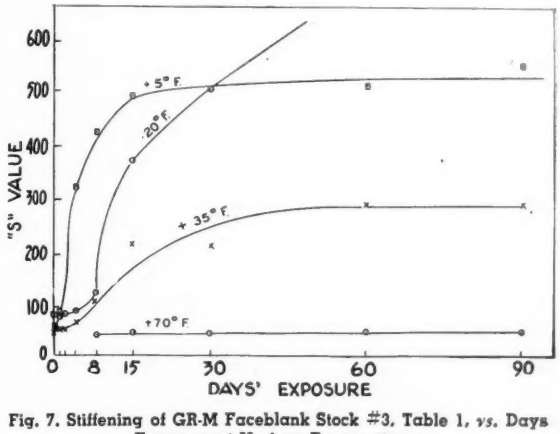


Fig. 7. Stiffening of GR-M Faceblank Stock #3, Table 1, *vs.* Days Exposure at Various Temperatures

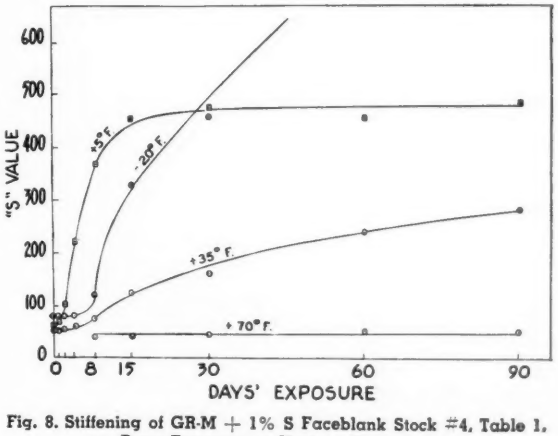


Fig. 8. Stiffening of GR-M + 1% S Faceblank Stock #4, Table 1, *vs.* Days Exposure at Various Temperatures

Figure 6, giving the plots for the GR-S stock at the same temperatures, shows no progressive decrease in flexibility with time of storage at any one temperature, but a decrease in flexibility at each lower temperature

TABLE 2. FORMULAE OF STOCKS USED IN STUDY OF EFFECT OF SULFUR CONTENT AND STATE OF CURE ON LOW TEMPERATURE FLEXIBILITY OF GR-I, GR-M, AND NATURAL RUBBER COMPOUNDS

Compound No.	8	9	10	11	12	13	14	15	16	17
GR-I	100	100	100	100						
GR-M					100	100	100			
Smoked sheets								100	100	100
Zinc oxide	5	5	5	5	12	12	12	30	30	30
Extra-light magnesium oxide					1	1	1			
Red lead oxide	0.5	0.5	0.5	0.5						
Stearic acid	1.5	1.5	1.5	1.5	1	1	1	1.1	1.1	1.1
Sodium acetate					0.5	0.5	0.5			
Salicylic acid								0.15	0.15	0.15
Sym. Di-beta-naphthyl-para-phenylenediamine								1.1	1.1	1.1
Phenyl alpha naphthyl amine					4	4	4			
Di-ortho-tolylguanidine salt of dicatechol borate					0.35	0.35	0.35			
Dimethyl thiuram disulfide	1	1	1	1						
Selenium dithio-carbamate	1	1	1	1						
Mercaptobenzo-thiazole								0.7	0.7	0.7
Santocure								0.24	0.24	0.24
Benzo-thiazyl disulfide					1	1	1			
S. R. F. black	70	70	70	70	30	30	30			
F. T. black					15	15	15			
Calcene								86	86	86
Factice					10	10	10			
Paraffin	4	4	4	4	2	2	2			
Heliozone								1	1	1
Petrolatum					1	1	1			
Dicapryl pythalate	6.67	6.67	6.67	6.67	15	15	15			
Dibutyl sebacate	6.67	6.67	6.67	6.67						
Dioctyl phthalate	6.67	6.67	6.67	6.67						
Light Circo Oil					5	5	5			
Sulfur	1.5	2	2.25	2.5	1	2	3	2	2.25	2.5
Cure:										
Min. at 320° F.	30	30	30	30	30	30	30	8	8	8
Physical Properties:										
Tensile p.s.i.	1457	1499	1275	1076	1867	1922	1982	2589	2561	2627
Elongation %	670	683	587	577	743	757	770	650	653	663
200% modulus p.s.i.	282	259	328	284	277	302	321	314	319	311
Crescent tear, lbs. in.	142	159	142	126	232	250	265	338	298	218

is quite evident. Such changes, considered due to the effect of second-order transition, were not noted in the GR-I stock.

The plots for the GR-M stock at various low temperatures (Figure 7) show the effect of both crystallization and second-order transition. An interesting point about these curves is that they show that GR-M is more flexible at —20° F. than at +5° F. between two and 30 days' storage. It is felt that this phenomenon is due to differences in the rate of crystallization of the polymer which apparently is near a maximum at +5° F.

Figure 8 indicates that the addition of sulfur to the GR-M stock has little effect on its low temperature properties.

Reclaim rubber stocks too show both crystallization and changes due to second-order transition (see Figure 9). Figure 10 shows, however, that the 100% smoked sheet compound has a much more pronounced tendency to crystallize at +5 and —20° F. even though it also is heavily loaded. A pure gum stock with little filler shows the same crystallization tendency as the loaded stock (see Figure 11), but here no effect of second-order transition is noted. To avoid discomfort in the faceblanks due to high modulus, both these natural rubber stocks were compounded with but 2% sulfur. Natural rubber vulcanized with more sulfur would have been more resistant to crystallization. To study the effect of % sulfur and time of cure on the low temperature flexibility of GR-I, GR-M, and natural rubber, the compounds shown in Table 2 were made up and A.S.T.M. test slabs" molded using an undercure, optimum cure, and overcure. Strips of the GR-I and natural rubber compounds were then stored at —20° F. and the GR-M strips at +5° F. The flexibilities of these materials were determined periodiçally, and "S" values calculated.

Figure 12, showing the results with the GR-I compound containing 2% sulfur, indicates the importance of cure time. But varying the sulfur content from 1.5 to 2.5%, as shown in Figure 13, does not appear to be critical.

Figure 14 shows the effect of cure time on a GR-M compound containing 3% sulfur. Long cure times with stocks containing 3% sulfur resulted in virtual elimination of the stiffening effect in GR-M, but such stocks have undesirable-modulus and inferior aging qualities. Figure 15 shows the effect of varying sulfur from 1% to 3%.

Figures 16 and 17 show the effect of cure on the natural rubber compound containing 2.25% sulfur and the effect of varying the sulfur in compounds #15, #16, and #17. Both cure and sulfur content are shown to be critical factors.

To determine the practical effect of the observed changes after storage at low temperatures in the flexibility of the gas mask faceblank stocks given in Table 1, faceblanks were molded and stored at —5° F. ±5° F. for 30 days. Twelve natural rubber faceblanks of unknown composition were also stored with the above. The GR-M faceblanks, the natural rubber faceblanks made from compound #6 (Table 1), and most of the commercial natural rubber masks were found to be too stiff for use after this treatment; whereas the others were still usable. Twenty-four other commercial natural rubber masks were stored at +5° F. for 60 days. At the end of this period two of the masks were too stiff for use; whereas the others were very flexible.

Discussion

Using as a criterion that the stock shall not stiffen on prolonged exposure at low temperatures, it is apparent that if gas mask faceblanks were made from compounds given in Table 1 (see also Figures 7 to 14), only those made of the GR-S stock would be satisfactory. Conversely, this would indicate that faceblanks made of GR-I and natural rubber could not be used at temperatures at or below —20° F. and +5° F. respectively.

However, since no trouble with natural rubber faceblanks at low temperature has been reported even though they have been rather extensively tested under mild arctic conditions, it follows that GR-I as well as the GR-S should be a suitable synthetic for use in gas mask

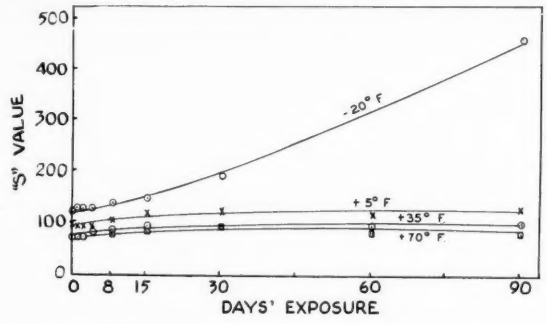


Fig. 9. Stiffening of Reclaim Faceblank Stock #5, Table 1, *vs.* Days Exposure at Various Temperatures

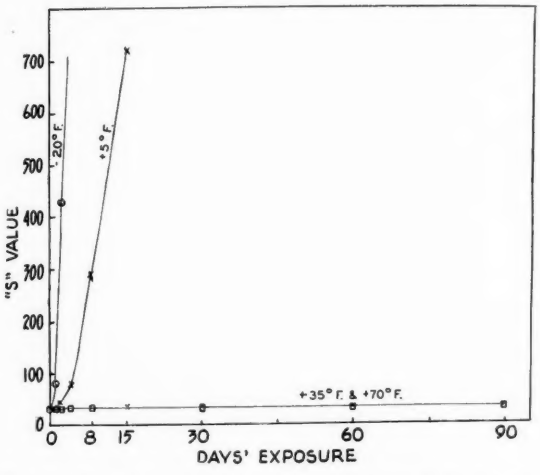


Fig. 11. Stiffening of Natural Rubber Faceblank Stock #7, Table 1, *vs.* Days Exposure at Various Temperatures

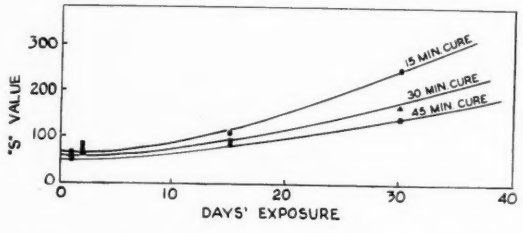


Fig. 12. Effect of Cure on Flexibility of GR-I Compound #9, Table 2, Stored at —20° F.

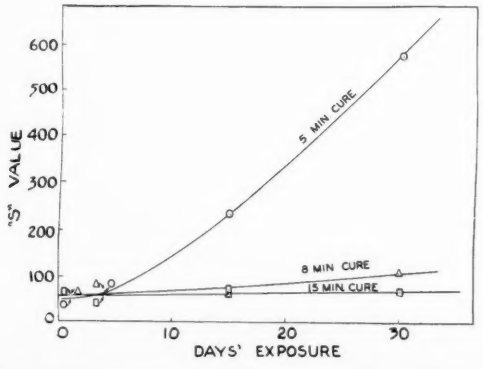


Fig. 16. Effect of Cure on Flexibility of Natural Rubber Compound #16, Table 2, Stored at —20° F.

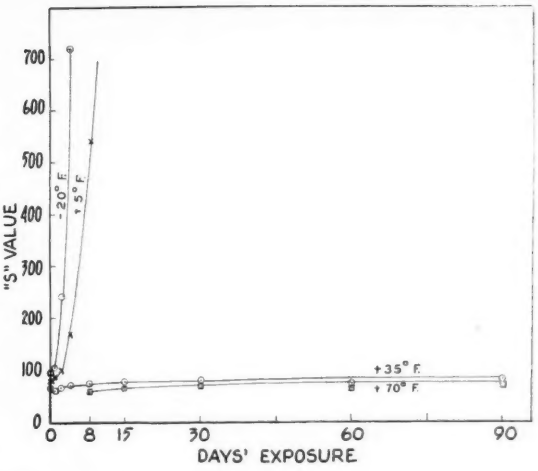


Fig. 10. Stiffening of Natural Rubber Faceblank Stock #6, Table 1, *vs.* Days Exposure at Various Temperatures

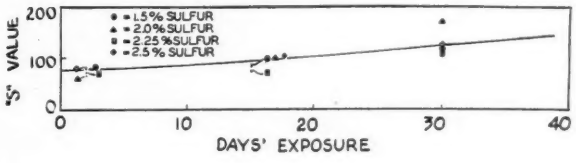


Fig. 13. Effect of % Sulfur on Flexibility of GR-I Compounds 8, 9, 10, and 11 on Table 2 Stored at —20° F.

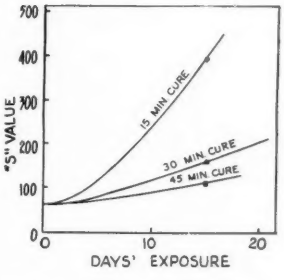


Fig. 14. Effect of Cure on Flexibility of GR-M Compound #14, Table 2, Stored at —20° F.

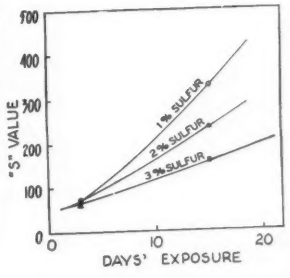


Fig. 15. Effect of % Sulfur on the Flexibility of GR-M Compounds 12, 13, and 14, Table 2, Stored at —20° F.

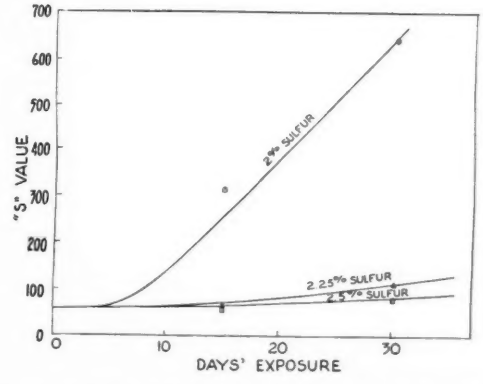


Fig. 17. Effect of % Sulfur on the Flexibility of Natural Rubber Compounds 15, 16, and 17, Table 2, Stored at —20° F.

faceblank manufacture. Considerable improvement in the low temperature characteristics of GR-I compounds would nevertheless be highly desirable. Owing to the poor hot tear and hence poor molding characteristics of GR-I, the latter is considered the most satisfactory synthetic elastomer available for faceblank manufacture at present.

In addition to its tendency to stiffen at low temperatures, GR-M has another drawback when used for gas mask compounds. GR-M gas mask facepieces which have become stiff from exposure to the cold are difficult to render flexible again unless dipped into warm water (100° F.) or hung in a warm room (80° F.). Cold stiffened natural rubber or GR-I facepieces, on the other hand, are easily rendered flexible by the warmth of the body.

From the above work it appears that progressive low temperature stiffening of most elastomers upon prolonged storage is to be expected except in the case of interpolymers such as GR-S with a fairly large amount of each component. It seems likely that this progressive stiffening is due to crystallization, and it would be of interest to have had X-ray diagrams of the elastomers after short and long exposure to substantiate this point. The progressive stiffening of GR-I in spite of its being an interpolymer and in spite of the large amounts of low temperature plasticizer present indicates that the diene monomer is not present in sufficient amounts to interfere with the crystallization of the isobutylene component.

Summary and Conclusions

A new method for measuring the flexibility of rubber has been described. The method consists essentially in determining the stress-strain curve obtained by loading and unloading a loop formed from a one-inch by six-inch strip cut from a test slab. A coefficient of flexibility independent of the thickness of the sample and, in addition information on % resilience were obtained.

By the use of the method described, the behavior of various natural and synthetic rubber gas mask facepiece compounds was studied during one month to three months' exposure at various temperatures down to —20° F. Progressive stiffening probably due to crystallization was found for natural rubber, GR-I, and GR-M compounds at low temperatures. No tendency to crystallize was noted for the GR-S compound. Of the crystallizable polymers GR-I was the most resistant, and GR-M the least resistant to stiffening during low temperature storage.

It is of course evident that different polymers have inherently different degrees of resistance to low temperatures.

Disregarding these inherent differences the work reported indicates that the resistance of elastomer compounds to stiffening during prolonged low temperature storage is favored by the following:

1. Use of interpolymers made from monomer mixtures having a relatively large proportion of each component, thus obtaining mutual interference with crystallization.

2. Use of a "tight" cure which probably so impedes the movement of the polymer chains as to make crystallization difficult.

Acknowledgment

The authors wish to express their appreciation to the Chemical Warfare Service and to the War Department Bureau of Public Relations for permission to publish the information given in this paper.

Silicone Rubber

(*Continued from page 608*)

as insulation wrapping tape for electrical coils and also as a thin gasketing material. Laminations or reinforced sheeting more than ⅛-inch thick can be produced by bonding together alternate layers of rubber and cloth. By this means tensile strengths of 2,000-3,000 lbs./sq. in. and tear strength of 200-300 lbs./in. are obtained. This factor is highly advantageous when strength is needed and elongation is not necessary. Bonding of the rubber to itself, glass, or metal can be accomplished with the use of a newly developed adhesive.

All these fabrication techniques or combinations of the same may be utilized when parts of varied designs and structure are required.

Conclusion

In conclusion it can be pointed out that silicone rubber is in no way a substitute material or just another elastomer. Its properties of thermal stability offer to the materials engineer a brand new product and a new range of temperature conditions where elasticity can be obtained.

Its flexibility range of from —70 to 500° F.; its resistance to oxidation, excellent heat aging, low compression set, and good electrical properties are factors that can be put to use in a variety of applications. To take full advantage of these desired properties, however, the limitations of the material should also be understood. These limitations can be overcome to a large extent by proper mechanical design. Fabrication techniques of molding, extrusion, wire coating, laminating, cloth coating, and bonding have been worked out successfully. The properties of silicone rubber combined with proper design and fabrication will result in products to solve many engineering temperature problems.

Letter to the Editor

November 26, 1947.

To The Editor,
India Rubber World,
386 Fourth Avenue,
New York, U. S. A.

Sir: Malayan Rubber Policies

There must be a large number of people in the U. S. who will suppose that matter appearing in your journal would have some degree of authenticity, and the article headed "Malayan Rubber Policies" to have emanated from an unbiased origin.

Anyone with an inside knowledge of the rubber producing industry will immediately recognize it as propaganda directed against the Malayan Government. If inspired by personal predilection, one wonders what Mr. Bauer has suffered at the hands of the British that he exercises his forensic acumen to such a purpose. Possibly he is associated with some political body which has for its object the disparagement of British rule in Malaya. One seems to recognize the technique—the careful marshalling of selected facts, the quotations scrupulously isolated from their context, and always in the background the suggestion of a predatory imperialism (or whatever cliché is now current for intelligent commercial enterprise).

The attack on the R. R. I. is most unfair. No doubt

(*Continued on page 619*)

Contributions of Organic Chemistry to the War Effort—Synthetic Rubber—IV[1]

R. F. Dunbrook[2]

THIS installment, the fourth of several, continues from our January issue the article by the former head of the Copolymer Research Branch of the Office of Rubber Reserve, which reviews the government research program on synthetic rubber from the viewpoint of the organic chemist.

High Temperature Polymerization

Polymerizations in the GR-S recipe at temperatures of 100 to 110° C. were conducted at the University of Illinois (50).[3] Under the conditions, as was to be expected, the rate of polymerization was very rapid. Conversions of 60% were obtained in 30 minutes and 80 to 85% in 60 minutes at a temperature of 95 to 100° C. At 100 to 110° C., conversions in the neighborhood of 65% were obtained in 30 minutes. These polymers were difficult to process and contained large amounts of gel. After milling, the gel disappeared and the polymers became soluble. Tires made from this rubber showed an improvement of 13% in wear over those made from GR-S.

The polymerization was carried out in lightweight stainless steel bombs two inches in diameter, with walls 3/16-inch thick and a capacity of 300 millimeters. Each bomb is capped with a two-inch standard pipe cap reinforced with a half-inch steel plate welded on the top and fitted with four large bolts by means of which a copper sheet gasket (1/32-inch thick) and a steel thrust plate (⅜-inch thick)are tightened down over the open end. An oil bath of 17-gallon capacity fitted with two two-kilowatt oil-immersion heaters and the usual temperature-regulating devices is used to heat the bombs. These are fastened on a shaft with U-bolts, and the shaft is rotated in the bath at a rate of 36 r.p.m. The polymerization is timed by a stop-watch from the instant of immersion. When the bombs are removed, they are quickly immersed into ice water, and the latex is coagulated with salt-acid.

Polystyrene in GR-S

It was felt that the properties of GR-S would be adversely affected by polystyrene if any considerable amount were formed during polymerization. This might happen in the plants since the butadiene is the last of the ingredients to be added to the reactors. It is conceivable that in case a delay occurs before the butadiene is added, some polystyrene might be formed. A number of methods for the determination of polystyrene in GR-S was investigated. Treatment of the polymer with tertiary butyl hydroperoxide and osmium tetroxide was found to give excellent results (51).

In brief, the method is based upon the principle that polymer molecules such as GR-S containing ethylenic bonds, when dissolved in benzene, can be split into fragments by a hydroperoxide such as tertiary butyl hydroperoxide in the presence of osmium tetroxide; while polymer molecules such as polystyrene containing no ethylenic bonds remain unattacked. The small fragments (low molecular weight aldehydes) are soluble in ethanol; whereas the unattacked polystyrene is insoluble. A separation of the polystyrene therefore consists merely of pouring the reaction mixture after breakdown of the polymer containing unsaturated groups into ethanol and filtering off the polystyrene.

Mixtures of GR-S and polystyrene (prepared by emulsion polymerization) were analyzed by this procedure. The results are reported in Table 15.

TABLE 15. DETERMINATION OF POLYSTYRENE IN POLYSTYRENE-GR-S MIXTURES

Amt. of PS Taken (Mg)	Amt. of GR-S Taken (Mg)	Amt. of Polystyrene Found (Mg)
200	300	201.4
0	500	0
10	500	9.9
200	300	201.4
500	0	499.0

As can be seen from the results, excellent agreement is found between the amount of polystyrene added to GR-S and the amount found by analysis.

It was also found that there is very little polystyrene in GR-S, which fact is proof that GR-S is a true copolymer and not a mixture of polybutadiene and polystyrene.

The oxidation of GR-S by this method offers interesting possibilities in connection with a study of the structure of copolymer. A quantitative determination of all the oxidation products should give a complete insight into the structure of GR-S and other polymers containing unsaturated bonds. The method appears to have definite advantages over degradation by ozone.

Compositional Relationship in GR-S

A large amount of experimental data shows that the relation between composition and conversion is the same for GR-S copolymers prepared in the laboratory and on the plant scale, if proper polymerization conditions are maintained (52). The composition of the polymer is unaffected by variations in the amount of mercaptan, the amount and kind of emulsifier, the catalyst and polymerization temperature. Even different recipes (ferricyanide activated hydrogen peroxide) seem to produce polymers having the same chemical composition as does the mutual recipe.

The relation between % conversion and % styrene in the polymer is given in Table 16 (53, 54).

TABLE 16. STYRENE CONTENT OF GR-S AT VARIOUS CONVERSIONS

% Conversion	Average % Styrene
0	17.2
20	17.9
40	18.7
60	19.7
80	21.2
90	22.5
100	25.0

It can be seen that the styrene content of GR-S copolymer is about 17.2% for the first polymer formed and rises gradually to 25.0% for 100% conversion. The rate of change of average styrene content increases with increasing conversion.

The styrene contents of polymer increments at differ-

[1] Presented before Division of Organic Chemistry, A.C.S., Chicago, Ill., Sept. 11, 1946.
[2] Office of Rubber Reserve, RFC, Washington, D. C. Present address, Firestone Tire & Rubber Co., Akron, O.
[3] Bibliography references appear at end of this installment.

ent conversions (instantaneous values) have been calculated for GR-S and are shown in Table 16 (53). These show the composition of polymer increments formed at various degrees of conversion for GR-S prepared with a charging ratio of 75:25 butadiene styrene. The data illustrate the striking heterogeneity of GR-S. This chemical (compositional) heterogeneity is in addition to the physical heterogeneity resulting from a distribution of molecular weights. Thus a 78% conversion polymer which has an average styrene content of 21.0%, actually is made up of polymer units containing from 17.2 to 28.6% styrene. As the conversion is increased, the heterogeneity increases enormously; a 90% conversion polymer with an average styrene content of 22.5% contains material of 36.5% styrene.

TABLE 17. COMPOSITION OF POLYMER INCREMENTS FORMED AT VARIOUS DEGREES OF CONVERSION (75:25 CHARGE RATIO)

Conversion, %	Styrene Content, %
0	17.2
20	18.8
40	20.6
60	
80	29.5
90	36.4
95	45.0
100	100.0

Structure of Polymers: 1, 2 *vs.* 1, 4-Addition

In the early period of the development of GR-S there was a strong tendency to attribute many or all of the short-comings of the product to the presence of vinyl side chains arising from 1,2-addition of butadiene during the formation of the polymer. Consequently there was a great interest in determining the relative occurrence of 1,2- and 1,4-butadiene units in polymers prepared under a great variety of conditions in order that any polymerization environment favorable to 1,4-addition might be recognized. The group at the University of Illinois undertook to study this aspect of the structure of GR-S by application of the ozonization reaction (55).

Ozonization Method

A number of products would be expected from the oxidative hydrolysis of the polyozonide from the GR-S molecule in which the monomer units may be arranged in numerous possible ways. Each 1,2-butadiene unit should give rise to one molecule of formic acid so that a measurement of the formic acid produced, coupled with knowledge of the monomer composition, should permit calculation of the percentage of butadiene units combined in the 1,2-manner. Other information concerning the manner in which the monomer units are combined could be gained by a study of the di- and polybasic acids produced in the reaction. Thus, where one 1,2-butadiene unit occurs between two 1,4-butadiene units, ozonization should produce butane-1,2,4-tricarboxylic acid; where a styrene unit occurs between two 1,4-butadiene units, β-phenyladipic acid should be formed; two contiguous 1,4-butadiene units should lead to succinic acid; a portion containing several contiguous 1,2-butadiene units should lead to a polybasic acid; alternation of styrene and 1,2-butadiene units and or styrene units leads to acids of very complicated structures.

The amount of formic acid produced by ozonization has been determined on a large number of GR-S and related polymers in the study carried on at Illinois. In addition two samples of GR-S, one standard and one undermodified, were ozonized in quantity sufficient to permit the isolation and identification of polybasic acids. A number of polybasic acids predicted from the random arrangements of butadiene and styrene units in the chain were isolated and identified. Thus succinic, trimethylbutane 1,2,4-tricarboxylic, β-phenyl adipic and other polybasic acids were identified which accounted for approximately 85% of the butadiene and 30% of the styrene in the copolymer. It was concluded that all possible arrangements of monomer units are present at random in the chain.

In Table 18 are recorded the ozonization numbers of some butadiene/styrene copolymers prepared under different conditions. Several sodium polymers and copolymers of butadiene with other monomers are included.

TABLE 18. OZONIZATION OF POLYMERS

Description of Polymer	Ozonization No.
Natural rubber, crepe	11.8 9.5 8.6
Butadiene/styrene, 75:25, 74% conversion	21.0 22.3
70:30, 73% conversion	22.1 19.8
65:35, 81% conversion	20.9
GR-S, 23.7%, unmilled	18.6 15.9
Cold-milled 10 minutes, gel free	16.9 13.3 13.5 15.4
At 110-130° C.	17.1 18.0
0.333% DDM, 49% conversion	18.6 18.5
0.400% DDM, 58% conversion	14.7 17.5
0.467% DDM, 70% conversion	17.2 19.7
0.533% DDM, 80% conversion	16.5 18.7
0.600% DDM, 90% conversion	15.4 16.6
Rosin soap emulsifier	14.3 15.9
Cationic emulsifier	13.4 14.3
DD amine hydrochloride-aluminum chloride	11.0 11.4
Polybutadiene emulsion at 50° C.	19.4 20.7
15° C.	17.9
110° C. for 30 minutes	12.0 11.8
110° C. for 60 minutes	11.8 13.6
Neoprene	5.8 7.0 6.2 5.4
Butadiene/o-chlorostyrene, 72:25	10.6 8.6 10.5
Butadiene/m-chlorostyrene, 75:25	12.6 11.8
Butadiene/m-bromostyrene, 75:25	10.2 8.7 9.1
Butadiene/β-vinylnaphthalene, 75:25	19.5 17.7 17.9
Butadiene/vinylpyridine, 75:25	13.2 13.4
Polybutadiene, German, sodium catalyst (Buna-115)	38.5 42.2
Russian, Sodium catalyst	42.8 40.5

The value of approximately 10% found for natural rubber is thought not to represent actual 1,2 arrangement of isoprene units, but rather a value which is to be expected from secondary oxidation of an unsaturated polymer. The low value for neoprene, however, shows that such oxidation is not entirely general. At best, the ozonization numbers represent only approximations of the 1,2-addition of butadiene and seem to be useful only in comparison with each other.

Under most conditions of preparation and subsequent treatment of GR-S, the ozonization value lies in the range between 15 and 20. Changes in the butadiene-styrene ratio, temperature, conversion and type of modifier and the use of ferricyanide activator are without effect. On the other hand butadiene-styrene polymers prepared with cationic emulsifiers show a distinctly lower value for 1,2-addition. Both hot and cold milling seem to reduce

the apparent vinyl group content slightly. Emulsion polybutadiene has the same ozonization number as GR-S, except when the butadiene is polymerized at 110° C.; then it drops to 12%.

The introduction of halogen- or nitrogen-containing monomers reduces the apparent vinyl side chain content to a very low value, often well below 13% in the samples studied. It is not certain whether this is truly a decrease in the amount of 1,2-addition or merely a drop in the secondary oxidation effects.

Perbenzoic Acid Method

Perbenzoic acid has been used extensively for the determination of unsaturation in ethylenic compounds. The Rubber Subcommittee Mission which was sent to Germany after the war found that the perbenzoic acid method was being used to determine 1,2 *versus* 1,4 addition in the Buna polymers (57). The amount of perbenzoic acid that has reacted with the unsaturated compound is determined by a simple iodometric titration. The rate at which perbenzoic acid reacts with an unsaturated compound is markedly dependent on the nature of the substituents of the carbon atoms joined by the double bond. For example, the reaction of perbenzoic acid with oleic acid at room temperature is complete within a few hours, but with crotonic acid no appreciable reaction occurs within a month.

The method is not confined to analytical studies of rubber, but can be used quite generally for the determination of the constituents of a mixture of two unsaturated compounds, one of which has a vinyl double bond and the other an internal double-bond, provided that the rates of reaction of the two are sufficiently different.

The method has been applied to the determination of the amount of 1,2- and 1,4- addition in polymers containing unsaturated groups. The determination is based on the difference in the rates of reaction of these two types of bonds with perbenzoic acid. Perbenzoic acid reacts more rapidly with internal double-bonds (1,4-addition) than with side vinyl groups (1,2-addition).

In the determination of 1,2-addition in polymers, perbenzoic acid is allowed to react with the purified polymer in a chloroform benzene solution. The reaction is allowed to proceed for a specified length of time, and then an aliquot portion of the solution is analyzed iodometrically for the amount of perbenzoic acid remaining. From this value the amount (in %) of double bonds which has reacted in that time is easily calculated. Finally, the "% of double-bonds reacted" is compared with a calibration curve which gives directly the corresponding composition of the polymer in % of 1,2-addition.

The reaction temperature, the solvent, and the degree of excess perbenzoic acid were found to have the greatest influence on the extent of substitution reactions. With an initial perbenzoic acid concentration not much above theoretical requirements (25%) and a low temperature (6° C.), the interference of side-chain oxidation can be maintained at a minimum.

TABLE 19. INTERNAL DOUBLE-BOND VALUES FOR BUTADIENE-STYRENE COPOLYMERS

Sample	% Internal Double-Bonds
GR-S	78, 77, 77, 78, 78
German Buna S-3, unsoftened	78, 78
Heat softened	78, 78
GR-S, 21.0% conversion	78
42.6% conversion	76
60.6% conversion	78
50° C. acid system, pH=4.3	82, 84
10° C. acid system, pH=4.5	85, 86

The procedure has been used to measure per cent. 1,4-addition in several samples of GR-S, polybutadiene, polyisoprene, polydimethylbutadiene and natural rubbers. Polyisoprene and emulsion polydimethylbutadiene have the highest proportion of internal bonds (88-90%) of all the synthetic samples analyzed. Tables 19, 20, and 21 show the values obtained for these rubbers.

TABLE 20. INTERNAL DOUBLE-BOND VALUES FOR MISCELLANEOUS SAMPLES

Sample	% Internal Double-Bonds
Alkaline emulsion polybutadiene	75
System polyisoprene	86
Emulsion polydimethylbutadiene	89, 88
Acid system polyisoprene	89, 88

TABLE 21. INTERNAL DOUBLE-BOND VALUES FOR NATURAL RUBBERS

Sample	% Internal Double-Bonds
Pale crepe	94, 95
Smoked sheet	97
Red Congo *(Landolphia)*	95
Benguella *(Landolphia)*	97, 97
Black Congo *(Funtumia)*	94

Emulsion polyisoprene and polydimethylbutadiene have the highest proportions of 1,4-addition of all the synthetic polymers measured. GR-S and German Buna S-3 show the same percentage of 1,4-addition. The number of internal double-bonds is the same for different conversions of GR-S. Polymerization in acid systems seems to favor 1,4-addition. Finally, natural rubbers show the highest 1,4-addition, namely 95%.

Bibliography

(50) Dearborn, Rabjohn, Marvel, private communications, University of Illinois to ORR, December 6, 1943, and May 11, 1944.
(51) Kolthoff, Dee, Carr, private communication, University of Minnesota to ORR, May 3, 1946.
(52) Baker, Heiss, private communication, Bell Telephone Laboratories to Office of Rubber Reserve, December 6 and 7, 1943.
(53) Meehan, *J. Polymer Sci.*, 1, 318 (1946).
(54) Wall, *J. Am. Chem. Soc.*, 67, 1929 (1945).
(55) Rabjohn, Bryan, Inskeep, Johnson, Lawson, *Ibid.*, 69, 314 (1947).
(56) Kolthoff, Lee, *J. Polymer Sci.*, 2, 206 (1947).
Kolthoff, Lee Mairs, *Ibid.*, 2, 199 and 220 (1947).
Saffer, private communication, Firestone Tire & Rubber Co. to ORR, April 25, 1946. In press.
(57) Marvel, PB32161, "The Status of Synthetic Rubber Research and Polymer Evaluation"—Report of Rubber Subcommittee Mission, Joint Intelligence Objectives Agency to ORR, November 28, 1945. Wendlein, *Chem. Eng. News*, 24, 771 (1946).

(To be continued)

Letter to the Editor

(Continued from page 616)

they can defend themselves, if they think it worth while, but few of your readers will take the trouble to learn how the R. R. I. have always urged small holders to avail themselves of their advice, or to suppose that the staff allocated to that work might depend on the extent to which this advice was sought. It will probably occur to your readers, however, that knowledge gained on large plantations cannot but benefit smaller ones.

As for bud-wood, a casual glance through the advertisement columns of pre-war Malayan newspapers will refute the suggestion that it has generally not been available to small holders. Perhaps the R. R. I. is expected to give reading lessons in the "kampongs." Anyone with a superficial knowledge of the mentality of small holders could tell Mr. Bauer why they have not favoured bud-grafting or systematic replanting, and at the same time explain to him why the economics of rubber production have favoured the development of large planting organizations.

Yours faithfully,
DR. F. J. PATON

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EDITORIALS

Let's Look at the Record for Rubber Policy

THE problem of national policy with regard to rubber has been before the government, the industry, and the consuming public of the United States ever since the end of World War II and, at this writing, does not seem to have been solved as yet as far as the controversial issues are concerned.

The Batt Inter-Agency Committee on Rubber was appointed in September, 1945, submitted its first report in March, 1946, and its second report in July, 1946, and was disbanded in February, 1947. As stated in this column in August, 1946:

"This Second Report of the Committee, while being an admirable and extensive document, still does more toward reemphasizing the many dilemmas confronting the Committee than it does to provide a complete and clear-cut solution of many of them."

After an extensive series of hearings in the first quarter of 1947, Congress passed Public Law 24 of the 79th Congress, in March, 1947. This so-called "temporary legislation," effective only until April 1, 1948, discontinued government purchasing of natural rubber.

After another extensive series of hearings which began in November, 1947, the House Armed Services subcommittee on rubber under the chairmanship of Rep. Paul Shafer of Michigan has been unable to reach a majority agreement on long-range rubber policy. Representative Shafer introduced his own bill in the House on January 19 for eventual discussion and approval or rejection by that body. A Senate Banking and Currency subcommittee, of which Senator John W. Bricker of Ohio is chairman, has begun study of the Shafer Bill and plans to meet to formulate a Senate bill on rubber within the next month.

Approximately two months remain before the expiration of Public Law 24, and other bills may be introduced, or the Shafer Bill may be extensively modified before passage; nevertheless an examination of the Shafer Bill in its present form in comparison with the Batt Committee Report of July, 1946, causes the editor of India RUBBER WORLD to wonder just how much has really been accomplished on formulating long-range rubber policy in the last 18 months.

Let's look at the record:

(1) On the subject of production and use of synthetic rubber, the Inter-Agency Committee Report recommended that there should be continuously maintained in production and use, regardless of cost, sufficient synthetic rubber capacity to meet at least one-third of our rubber requirements, exclusive of requirements of special-purpose rubbers. A minimum consumption of about 250,000 long tons per year of general-purpose rubber was suggested.

The Shafer Bill requires that facilities in operation by the government or private persons shall produce annually not less than one-third of the 600,000 long tons a year general-purpose rubber and 75,000 long tons a year special-purpose rubbers capacity to be maintained within the United States at all times.

(2) The Batt Committee's recommendation as to the best method of assuring a minimum use of synthetic rubber was product specification or subsidy, or a combination of both.

The Shafer Bill authorizes the President to exercise allocation, specification, and inventory controls of natural and American-made rubber and by regulation to require consumption in the United States of American-made general-purpose rubber in a specified percentage of the combined total consumption of natural rubber and American-made general-purpose rubber consumed annually in the United States and also to require the consumption of specified percentages of American-made special-purpose rubber.

(3) On plant disposal, the Batt Committee stated that private ownership and operation of the synthetic rubber industry should be a major objective since this would provide an important contribution to research and development. In the interest of developing competitive conditions in the synthetic rubber industry, the amount of production capacity in private hands should exceed the amount of guaranteed use.

If the Shafer Bill becomes law, the President is to designate a government agency for the disposal of the synthetic plants, but no disposition can be accomplished without an affidavit from the National Security Resources Board and a concurrent resolution of Congress. However, "wherever possible the sale or lease of any facility shall be made so as to encourage the development of new, independent enterprises," the bill states.

(4) The Batt Committee recommended that broad research programs for quality and cost improvements in the synthetic rubber field should be continued by government and private industry.

The Shafer Bill states that the powers, functions, duties, and authority of the United States to undertake research and development and allied fields shall be carried on by such agencies of the government that the President may designate. The cost is to be paid by such sums as the Congress may appropriate.

On the important issues of the patent pool and the exchange of information agreements, an improved pricing formula for use by the government in setting the selling price of GR-S, and, in fact, the disposal of the synthetic plants, no solution has been reached and may not be reached before a new law is passed. "Unsettled world conditions" and "national security" cannot be used to justify the failure to reach a decision on all of these controversial issues. In the remaining two months before the new law must be passed, there still is time for progress to be made on the patent pool and cross-licensing agreement, on pricing, and even on less-restrictive plant disposal.

Plastics Technology

Major Advances in Plastics during 1947[1]

James W. Underwood[2]

PROBABLY the most startling announcement during 1947 was that plastics were being used as drugs (1).[3] It has long been known that excess acidity in the stomach was a direct cause of stomach ulcers. Since ion-exchange resins have been known for many years, it is perhaps only the commendable caution of physicians in not publishing results of medical research until thoroughly checked that has kept this announcement from publication until lately. An interesting part of this announcement is that the hydrochloric acid adsorbed by the resin in the stomach is released in the intestines to be returned to the body system.

Another announcement that revealed an unusual property of plastics was that when an electrical potential is applied to transparent plastics, the strains created prior to dielectric breakdown can be viewed by polarized light in the same way as is possible to view strains created by mechanical forces (2). Since mechanical strains will also be visible, it is necessary to view the specimen at zero voltage in order to determine which parts of the strain pattern are caused by the electrical stresses. Because both the strain patterns are visible, the fact has already been established that mechanical stress influences the direction of dielectric breakdown. With this new tool available it should be possible to gain a better understanding of the cause and mechanism of dielectric breakdown.

Molds and Molding

Mold cavities are much more economical to make by hobbing than machining if a number of cavities are to be made. However, owing to the limited amount of upward flow of metal into the engraved portion of the hob it is impossible to hob intricate designs, but these are now practical by powder metallurgy techniques (3). The hob, mounted on a shank of correct diameter, is inserted face upward in a bull ring of the desired inside diameter. The metal powders are poured on top of the hob and the punch is positioned. After pressing at pressures ranging from 30 to 90 tons per square inch the metal compact is removed and sintered at 1260° C. for one hour per inch of thickness. Since sintering causes the compact to shrink, the sintered compact, after cooling, is coined, using the original hob to resize the cavity and to give it the same finish as the hob.

Powder metallurgy techniques are also being used to mold polytetrafluoroethylene (4). Owing to the fact that the temperature at which this material can be molded practically corresponds to its decomposition temperature, it has been impossible to mold it. By this new technique, finely powered polytetrafluoroethylene is pressed into a compact in the same way as is used for making powdered metal compacts. Pressures of 100 to 3,000 pounds per square inch are usual but may be as low as 25 and as high as 50,000 pounds per square inch or more. After removal from the mold the compact is heated to a temperature between 327 and 400° C. for a time sufficient for the entire mass to reach 327° C., the temperature above which the polymer is transparent and below which it is opaque due to a change in crystallinity. Quenching of the heated parts produces tough, resilient pieces; while slow cooling produces parts which are softer and less stiff than quenched parts and have lower tensile strength. Slow cooling is necessary for intricate parts which are likely to distort. Although the parts shrink when sintered, the amount of shrinkage can be predicted and allowed for in making the compact.

Polyvinyl Chloride Pastes

During the war, owing to a shortage of solvents in England, polyvinyl chloride pastes were developed which contain no solvent (5). These pastes are based on the fact that although the plasticizers used are compatible with the polyvinyl chloride, they are not absorbed by the resin at an appreciable rate at room temperature, but are rapidly absorbed at elevated temperatures to form smooth coherent gels identical with regularly processed plasticized polyvinyl chloride. As regularly compounded, the pastes are a mixture of plasticizer, stabilizer, pigment, and resin. They are free-flowing fluids of varying viscosity depending on the amount of plasticizer. They may be formed into useful articles by spreading with a conventional doctor knife, spraying, dipping, or casting. After application, the paste is heated to 140 to 150° C. to form a coherent mass (5-9).

Since no solvents are used in the pastes, thicker coats can be applied by dipping in one operation than could be applied by the older solvent compositions which were limited to dilute solutions because of the limited solubility of the resin and the tendencies of concentrated solutions to gel at room temperature (6, 8). Although cold dipping forms can be used, the thickness of the coating will be limited by the viscosity of the paste. After gelling with heat the form can be redipped and the process repeated as many times as necessary to give the desired thickness. However the more economical way to form thick coats is to heat the dipping form to a predetermined temperature and then immerse it into the paste. The heat of the form partially gels the resin, allowing much thicker coats to be built up in a single dipping operation. The resin is completely gelled by further heating and then stripped from the mold (5, 6).

Slush casting of hollow articles can be accomplished by the same technique, except that in this case the paste is poured into the heated mold, care being taken not to entrap air bubbles, and then the excess paste is poured out after the desired thickness has gelled on to the walls of the mold (5).

Since very little pressure is required to inject the paste into molds, very light and inexpensive molds of plaster of Paris, brass, or steel can be used, and even a grease gun used to inject the paste into the mold (5).

The development of these pastes has made it possible to produce films as thin as one mil to four mils, with a tolerance of 1/10-mil, in a relatively simple operation. The paste is knife-coated on to an endless stainless steel belt; then it travels through an oven to fuse the resin. After coming from the oven the film is stripped from the belt (6). The ability to control the thickness of vinyl films within close tolerances is becoming increasingly important since heat sealing with electronic heaters is only successful with uniform-gage sheets. Experience has shown that with decreasing sheet thickness the specific power in watts per square inch required to obtain successful welds increases very rapidly. For example, two sheets each five mils in thickness require about 425 watts per square inch; while two sheets each one mil in thickness require about 1,000 watts per square inch to form satisfactory welds (6, 10).

Compounding

A process of compounding the thermoplastic molding materials utilizes a principle very similar to that for vinyl pastes. The resin, dye, pigment, stabilizers, fillers, etc., are placed into a rotatable cylindrical chamber so constructed that while it is rotating, the plasticizer and other liquid additives (presumably solvents to hasten the absorption of the plasticizer by the resin) can be sprayed into the chamber as a fine mist. After the proper length of time hot air is filtered through the material to evaporate the volatile materials. The material is discharged as a free-flowing powder ready for molding (11).

A method of continuous compounding of thermosetting molding compounds was revealed in an article reporting on German practices (12). At first a method similar to extrusion was tried. However, since heat is liberated both because of friction and the exothermic reaction of the resin as it is processed, hot spots were created that caused localized curing of the resin which stuck to the side walls of the extruder, soon causing the entire mass to clog the extruder. The method finally evolved was to feed a premix of the powdered resin, dyes, pigments, fillers, lubricants, and accelerators to the center of a regular set of compounding rolls. Strips of processed resin are cut from the edges of the roll, causing the resin to feed out automatically from the center to the sides. Length of time on the rolls, therefore, was governed by the width of material cut off from both ends. As far as known, no similar practice is being used in the United States.

Forming Plastic Sheet

Thermoplastic sheet stock can be formed either by free blowing or by the use of forming dies. Free blowing allows only limited control of contours and is adapted only to those shapes more or less semispherical in structure. However, since nothing but air comes in contact with the surface of the sheet, the optical properties of the original sheet are maintained. For complicated shapes and those having sharp changes in contour it has been necessary to use forming dies. Since any imperfection in the surface of the mold is reproduced in the surface of the formed sheet, it was always necessary to have highly polished molds which were expensive to make.

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[1] Presented before Rubber and Plastics Division, American Society of Mechanical Engineers, annual meeting, Atlantic City, N. J., Dec. 4, 1947.

[2] Plastics laboratory, General Electric Co., Pittsfield, Mass.

[3] Bibliography references appear at end of article.

In order to combine the two methods a new process known as "ridge forming" has been developed to make shapes which are impossible to form by free blowing (13-14). The heated sheet to be formed is clamped across an opening just a little larger than the horizontal cross-sectional area of the part. The sheet is formed by a skeleton framework which contacts the sheet only at those areas that determine the final shape of the article. If the draw is more than half the width of the opening, it is desirable first to use vacuum forming to draw the plastic to a free-blown shape slightly deeper than the depth of the shape desired. The ridge mold is inserted and the vacuum released, allowing the sheet to snap back and cool in place.

Preheating

Preheating of thermosetting materials by use of high-frequency heaters has proved to be economical as evidenced by its wide adoption by the molding industry. However the high cost of the equipment, both to install and operate, has tended to limit somewhat its universal adoption. Steam preheating has overcome this difficulty since steam preheaters are very cheap in comparison to dielectric preheaters where preheating of charges of several pounds is desired. Steam preheaters can be combined with infrared as well as electrical heaters.

Articles in both American and British magazines (15-17) indicate that steam preheating was independently developed in both countries. Results indicate that the properties of molded parts made from steam preheated preforms are about equivalent to parts made from dielectric preheated preforms in all but electrical properties, which fact rules out steam preheating for high-grade electrical parts. Preheating time for steam preheating is much longer than for dielectric preheating. In a comparable test where the closing time of the press was five seconds in both cases, it took 15 seconds to preheat with a high-frequency preheater and eight minutes to preheat with a combination steam-infrared preheater. This latter disadvantage can be overcome by using a multiple tray unit large enough to allow the necessary time in the preheater. One major advantage of steam preheating is that leaving the preform in the preheater for a longer time than necessary to preheat the preform apparently does not cure the molding compound.

In one test run a set of preforms was heated in a steam preheater for 7½ minutes. A single preform was removed and transfer molded, and then another preform removed and transfer molded. The process was repeated until the last preform to be tested was removed after a total preheat time of 48½ minutes. No noticeable difference in transfer time could be attributed to curing of the preform. Unfortunately no mechanical or electrical tests were run on the test samples.

Machine Developments

Both methods will no doubt be used side by side in many molding plants because of the above differences. Certainly steam preheating would not adapt itself to the combination molding machine announced early this year (18-19). In this machine, granular molding compound flows by gravity from a hopper to an adjustable metering chamber from whence it is transferred by a hydraulic ram and then by gravity to a preform chamber where a second hydraulic ram preforms the powder. At the proper time the preform falls by gravity between two electrodes of a high-frequency preheater and again by gravity to the transfer chamber where a third hydraulic ram transfers the compound to the mold cavity. After the compound is cured the mold opens and the operator removes the flash, runners, and molded parts as well as any cured compound on the force. After the operator closes the safety gate, the mold closes and locks and another preheated preform is dropped into the transfer chamber for a repetition of the cycle. As can be seen, the cycle involving metering, preforming, and preheating overlaps the cycle transferring and curing the compound.

On a typical job, a kitchen cabinet handle is molded in an eight-cavity mold using a 24-second preheat time and a 48-second cure time with an output of 60 cycles per hour.

Electronic preheating is also used in combination with a machine developed to edge-glue lumber using urea resin glues (20). Phenolic resin glues cannot be used at present owing to a tendency to arc during curing. By use of this machine 1,000 feet of lumber with a maximum width of glued panel of 37 inches can be edge-glued in one hour. It effectively removes what is the usual bottleneck in the woodworking industry.

Another automatic machine that has greatly increased production and will result in lower costs for transparent boxes is a machine that will produce 1,000 boxes an hour (21). Size limits are infinitely variable from a lower limit of 2¼ inches to a maximum of 13¼ inches on either side, and a minimum depth of ½ inch to a maximum of four inches. Thickness of stock may be from five mils to 20 mils. The machine takes the rolled sheet stock slit to the desired width and automatically blanks, crimps, and glues the stock into a finished box half. The only concession to ordinary rolled sheet stock that had to be made was that the stock had to be rolled on a core of at least nine inches diameter, since on smaller cores the material on the inside of the roll took a permanent set and had too much curvature to be formed into a satisfactory box.

New Resins and New Uses

Several companies announced new modifications of old materials, such as Plexiglas Special U.V.A., a polymethyl methacrylate able to adsorb ultraviolet light (22); Plexiglas V, a polymethyl methacrylate having a heat distortion temperature of 90° C. (23); Lustrex, a polystyrene having a heat distortion temperature of 87 to 88° C. (24); and Tenite III, a cellulose acetate propionate (25-26).

Only one entirely new material was offered to the trade. This new material was diallyl phenyl phosphonate (27). As with all monomers containing two allyl groups in the molecule, it polymerizes to form a thermosetting resin and is capable of conferring this property on copolymers containing it in sufficient quantity. Other properties of the polymer of diallyl phenyl phosphonate which make it appear promising are its high index of refraction, its ability to wet glass fibers, and its flame resistance. The index of refraction is 1.57 so that as a transparent solid it is exceeded only by the flint glasses and polystyrene. A composition having any desired index of refraction below this value can be obtained by copolymerizing this material with the correct percentage of another polymerizable monomer whose polymer has a lower index of refraction than that desired. Glass cloth laminates have been made where the glass fibers were wet sufficiently and the index of refraction of the polymer so nearly matched the index of refraction of the glass fibers that the resulting laminates were transparent.

Silicone resins have been found to be excellent for sizing paper (28). Less than 0.1% resin is necessary to give good results. It is added to the beater stock which must have a pH value below 7. Hard water decreases the sizing effect, but this difficulty can be overcome by the addition of a small amount of silicone oil emulsion. This small amount of size does not affect the strength properties. Using larger amounts of silicone resin for size decreases the strength properties, except for tear strength which is increased. The small amounts of silicone resin necessary for good sizing make the silicones especially suited for papers where the larger amounts of ordinary size might cause difficulties. This point suggests the use of silicone resin as a sizing for cigarette and condenser paper.

Conclusions

In retrospect we can see that the major advances in plastics during 1947 have been distributed between uses, properties, processes, products, equipment, and materials. Advances in such a wide diversity of fields are a sign of a healthy industry.

Bibliography

(1) "Plastics for Ulcers." *Modern Plastics*, 25, 1, 182 (1947).
(2) "Photodielectric Analysis of Materials." J. Delmonte, *Ibid.*, 24, 6, 163 (1947).
(3) "Sintered Metal Cavities." *Ibid.*, 24, 7, 144 (1947).
(4) "Molding Polytetrafluoroethylene."*British Plastics*, 19, 163 (1947).
(5) "Outlets for Polyvinyl Chloride Paste." *Modern Plastics*, 24, 10, 110 (1947).
(6) "Vinyl Paste Resin." M. N. Burleson, *Ibid.*, 24, 12, 108 (1947).
(7) "Vinyl Paste in England." P. Reilly, *Ibid.*, 24, 12, 214 (1947).
(8) "A Vinyl Dip-Coat" *Ibid.*, 24, 11, 156 (1947).
(9) "Geon Paste Resin Aids Vinyl Processing." M. N. Burleson, *Plastics (Chicago)*, 7, 2, 18 (1947).
(10) "Special Problems of High-Frequency Welding of Very Thin Plastic Sheets." J. Freeman, H. P. Zade, *Plastics (London)*, 11, 472 (1947).
(11) "Compounding Plastic Materials by a New Method." J. Sandler, *Modern Plastics*, 24, 6, 137 (1947).
(12) "German Thermosetting Resins." Part II. *Ibid.*, 24, 9, 153 (1947).
(13) "Ridge Forming Acrylic Sheet." W. W. Farr, R. Tomlinson, *Ibid.*, 24, 11, 114 (1947).
(14) "Compound Forming of Acrylic Sheets." W. W. Farr, O. L. Pierson, *Plastics (Chicago)*, 6, 6, 53 (1947).
(15) "Preheating Plastics with Live Steam." S. K. Moxness, J. Formo, *Modern Plastics*, 24, 6, 141, (1947).
(16) "Preheating with Steam." S. K. Moxness, J. Formo, *Plastics (Chicago)*, 6, 2, 34 (1947).
(17) "Preheating with Steam." C. G. Phillips, *British Plastics*, 19, 330 (1947).
(18) "One Machine with Four Molding Functions." *Modern Plastics*, 24, 9, 135 (1947).
(19) "How the 'Hy-Jector' Cuts Production." *Plastics (Chicago)*, 6, 6, 36 (1947).
(20) "Edge Glued by Machine." *Modern Plastics*, 25, 2, 138 (1947).
(21) "Plastic Boxes Can Now Be Made Automatically." *Ibid.*, 24, 10, 123 (1947).
(22) *Ibid.*, 24, 6, 206 (1947)
(23) "Heat Resistance, Clarity in New Acrylic." *Ibid.*, 24, 12, 119 (1947).
(24) "A High Heat Resistant Polystyrene." R. I. Dunlap, Jr., S. E. Glick, *Ibid.*, 24, 12, 127 (1947).
(25) *Ibid.*, 24, 12, 120 (1947)
(26) "Tenite III—A Cellulose Acetate Propionate." *Plastics (Chicago)*, 7, 2, 58 (1947).

(27) "A New Thermoset Resin." *Modern Plastics*, 24, 12, 226 (1947).
(28) "Beater Sizing with the Silicones." C. J. Bergdahl, C. E. Libby, *Paper Trade J.*, 125, 10, 108 (1947).

References to Other Developments

(29) "Nylon to Be Made from Furfural." O. W. Cass, *Modern Plastics*, 24, 8, 222 (1947).
(30) "Furfural and Its Derivatives." H. E. Fleck, *Plastics (London)*, 11, 534 (1947).
(31) "Synthesis of Protein Analogs." R. B. Woodward, C. H. Schramm, *J. Am. Chem. Soc.*, 69, 1551 (1947).
(32) "Phenolics, not Rivets, Bond Brake Linings." *Modern Plastics*, 25, 2, 100 (1947).
(33) "Resin Bonded Laminates Build Better Whisky Barrels." *Plastics (Chicago)*, 7, 2, 16, (1947).
(34) "Atom Smasher Uses Low Pressure Laminates." *Modern Plastics*, 24, 11, 91 (1947).
(35) "The Microscopic Examination of Plastic Materials." J. H. Wredden, *Plastics (London)*, 11, 37, 98, 153, 194, 263, 329, 387, 443, 498 (1947).
(36) "Planned Mold Maintenance Service Aids Economical Production." W. M. Halliday, *Ibid.*, 11, 48, 108, 161, 216 (1947).
(37) "Mechanical Precision in Molded Plastic Parts." S. K. Moxness, India Rubber World, 115, 5, 677 (1947).
(38) "Linear Shrinkage of Phenolic Moldings." S. W. Hargreave, J. H. Martin, *British Plastics*, 19, 216 (1947).
(39) "Properties of Cellulose as Applied in Plastic Materials." W. E. Choor, *J. Chem. Ed.*, 24, 214 (1947).
(40) "Spectral Transmission of Transparent Plastics." R. B. Rice, E. F. Fiedler, J. J. Pyle, *Modern Plastics*, 24, 9, 156 (1947).
(41) "Effect of Catalyst and pH on Strength of Resin-Bonded Plywood." G. M. Kline, F. W. Reinhart, R. C. Rinker, N. J. DeLellis, *Ibid.*, 24, 11, 123 (1947).
(42) "The Stress-Strain Relationship of Nylon under Biaxial Stress Conditions." J. Miklewitz, *J. Colloid Sci.*, 2, 217 (1947).
(43) "High-Frequency Heating of Non-Conducting Materials." F. J. Jolly, *Trans. Am. Soc. Mech. Engrs.*, 69, 155 (1947).
(44) "Cost Analysis of Dielectric Heating." T. N. Willcox, *Modern Plastics*, 24, 7, 131 (1947).
(45) "What to Look for in High-Frequency Heat Sealing Equipment." P. Weiss, *Ibid.*, 24, 12, 138 (1947).
(46) "Acetylated Cotton as Filler for Phenolic Molding Powders." E. E. Halls, *Plastics (London)*, 11, 480 (1947).
(47) "Cast Resin for High-Impedance Circuits." P. J. Franklin, M. Weinberg, *Modern Plastics*, 24, 11, 99 (1947).
(48) "Four Outlets for Fast Curing Phenolics." L. R. Miller, *Ibid.*, 25, 1, 118 (1947).
(49) "How to Use Nitrile-Rubber Vinyl Resin." J. C. Pittenger, G. F. Cohan, *Ibid.*, 25, 1, 81 (1947).
(50) "Continuous Structural Board from Sawdust." *Ibid.*, 25, 1, 89 (1947).
(51) "Lens Molding for Television." R. V. Beshgetoor, *Plastics (Chicago)*, 6, 4, 11 (1947).
(52) "British Lenses Combine Molding, Casting." D. Starkie, *Modern Plastics*, 25, 2, 107 (1947).
(53) "Optical Plastic Materials." D. Starkie, *British Plastics*, 19, 96 (1947).
(54) "Modern Applications of Plastic Optical Materials." *Plastics (London)*, 11, 117 (1947).
(55) "Making and Using Thermoplastic Laminates." *Modern Plastics*, 24, 6, 91 (1947).
(56) "Photographic Process Speeds Marking." *Plastics (Chicago)*, 7, 1, 26 (1947).
(57) "Wood Treatment with Resin Forming Systems." M. A. Millett, A. J. Stamm, *Modern Plastics*, 25, 1, 125 (1947).
(58) "Processing Polyvinylidene Chloride." *Ibid.*, 25, 1, 97 (1947).
(59) "Press Design Solves Many Molding Problems." *Plastics (Chicago)*, 6, 4, 296 (1947).
(60) "A New Preform Press." *Modern Plastics*, 24, 10, 204 (1947).
(61) "Portable Welder That Cures Resin Adhesives." *Ibid.*, 24, 9, 206 (1947).
(62) "Flame Spraying of Powdered Materials." W. D. Jones, *Sheet Metal Inds.* 24, 375 (1947).
(63) "Shori Gum for Polyethylene." *Plastics (London)*, 11, 511 (1947).
(64) "Coloring Plastics." W. S. Penn, *Ibid.*, 11, 10 (1947).
(65) "'One Shot' Multi-Color Extrusions." *Plastics (Chicago)*, 6, 4, 70 (1947).
(66) "Two-Color Thermosetting Moldings." *Modern Plastics*, 25, 2, 148 (1947).
(67) "Copying Natural Horn in Button Making." *Plastics (London)*, 11, 404 (1947).
(68) "Polyvinyl Acetate in Powder Metallurgy." H. L. Strauss, Jr., *Modern Plastics*, 24, 10, 196 (1947).
(69) "Economics of Low Pressure Plastics." *Ibid.*, 24, 8, 95 (1947).
(70) "The Present State of Organosilicon Chemistry." C. A. Burkhard, E. G. Rochow, H. S. Booth, J. Hartt, *Chem. Revs.*, 41, 97 (1947).
(71) "A Survey of the Plastics Industry." A. L. Carr, United States Department of Justice, Washington, D. C. (1947).
(72) "Plastics—a Growing Industry." C. Muller, *Business Developments*, 10, 2, 11 (1947).

Chicago S.P.E. Elects

THE election of officers for 1948 of the Chicago Section, Society of Plastics Engineers, Inc., took place at the Section's annual Christmas Party on January 9 at the Edgewater Beach Hotel, Chicago, Ill. Approximately 150 members and guests attended and enjoyed a program consisting of a cocktail hour, dinner, vaudeville entertainment, and dancing. The program and arrangements for the meeting were handled by Elmer Maywald, Maywald Co.

The following officers were elected: president, William L. Hess, Anesite Co.; vice president, Roy Bauspies, Midwest Molding & Mfg. Co.; secretary-treasurer, Robert S. Stephens, Kurz-Kasch, Inc.; and directors, Charles Dassing, Bakelite Corp., James Johnston, Chicago Molded Products Co., William W. Wright, Service Plastics Co., Clarence McCormick, Superior Plastics Co., and L. V. Swift, Sandee Mfg. Co.

S.P.I. West Coast Conference

THE West Coast Section of the Society of the Plastics Industry will hold its annual conference together with a unique exhibit on March 28 to 31 at the Hotel Biltmore, Santa Barbara, Calif. According to R. B. Gutsch, chairman of the Section and general manager of aaRBee Plastics Co., the conference will feature a merchandising exhibit demonstrating the most successful procedure in originating, designing, advertising, and marketing typical plastic products. The conference will emphasize the work of molders and other plastics firms in the San Francisco and Los Angeles areas where most of the West Coast industry is concentrated.

Herbert G. Pratt, of American Cyanamid Co., is conference chairman, and Grant Ehrlich, of Resin Industries, is Santa Barbara coordinator for the committee. There will be a banquet on the evening of March 30, and a golf tournament is scheduled for March 31. The program is being coordinated with retail merchants' associations, and many representatives of retailing outlets are expected to attend. Conference speakers will be announced at a later date. Persons planning to attend should make reservations by February 20, if possible, through Erven White, Owens-Corning Fiberglas Corp., 3445 W. Eighth St., Los Angeles 5, Calif.

Ohio S.P.E. Committees

SOME 54 members and guests of the Central Ohio Section, Society of Plastics Engineers, Inc., attended a regular dinner-meeting on January 8 at the Wagner House, Newark, O. The dinner was preceded by a cocktail hour sponsored jointly by Newark Plastics, Inc., and Plastics Design & Sales Co. At the dinner G. N. Edwards, president of Ohio Plastics Co., spoke on "Where Are We Going?" Mr. Edwards' talk was popular in nature, having as its general theme, to get the most out of life one must have a proper balance of thought, will, and emotions.

At the business session following the dinner, L. E. Cheyney, president of the Section, announced the committee appointments, with chairmen as follows: program, W. J. Braley, Columbus Plastic Products, Inc.; house, M. W. Burkhart, Plastics Design & Sales Co.; publicity, R. A. Clark, Battelle Memorial Institute; membership, R. W. Shreck, Hydraulic Press Mfg. Co.; credentials, R. C. Williams, Ironsides Co.; finance, R. D. Beck, Continental Can Co.; and professional activities, E. E. McSweeney, also of Battelle.

The Section's next meeting will be held on February 12 at a meeting place in the Newark area. Featured speaker will be Gordon C. Mack, who will talk on "Patents." Door prizes, contributed by Columbus Plastic Products, Inc., will be given.

Film on Plastics for Quebec Group

THE Quebec Rubber & Plastics Group held a meeting January 8 at the Ritz-Carlton Hotel, Montreal, P. Q., Canada. Approximately 40 members attended the session, which featured the film, "The Formica Story," by W. T. Farrell, of Arnold Banfield & Co., Ltd. The moving picture covered the history and evolution of Formica phenolic plastics from their inception up to the present day.

Dow Releases Saran Trade Mark

DOW CHEMICAL CO. has formally released its trade mark rights to the name "Saran," permitting it to become the descriptive name of the product. Announcement of the release was made by Donald Gibb, head of the company's plastics sales division, on January 19. The action was taken, Mr. Gibb said, "in the interest of simplifying identification on various plastic materials whose chemical names have for years been confusing to press, trade, and consumer alike."

The term "Saran" applies to a series of thermoplastic resins chemically known as vinylidene chloride copolymers, originally developed by Dow, and known especially for their resistance to a wide range of chemicals. Applications of the plastic include monofilaments for the textile industry, moisture repellent packaging films, and corrosion resistant piping.

P.M.M.A. Elections

JOHN R. HOOVER, vice president, B. F. Goodrich Chemical Co., and D. S. Frederick, vice president, Rohm & Haas Co., were reelected president and vice president, respectively, of the Plastic Materials Manufacturers Association, Inc., at the annual meeting in New York, N. Y., on January 8. F. H. Carman was elected secretary-general, and John E. Walker treasurer of the Association.

New members elected to the board of directors were: C. F. Hosford, Jr., vice president of Koppers Co., Inc.; W. W. Knight, Jr., general manager of Plaskon Division, Libby-Owens-Ford Glass Co.; and Spencer E. Palmer, assistant vice president of Tennessee Eastman Corp. Harry Krehbiel, president of Catalin Corp. of America, and W. S. Landes, vice president of Celanese Corp. of America, will continue as directors along with Mr. Hoover and Dr. Frederick. Arnold E. Pitcher, general manager of plastics department, E. I. du Pont de Nemours & Co., Inc., a past president of the Association, will serve in an advisory capacity to the board of directors. The chemical products division, Goodyear Tire & Rubber Co., was elected to membership in the Association.

The Association's Resin Adhesive Division elected J. C. Garrels, Jr., manager of the Lockport plant, Monsanto Chemical Co., as its chairman for 1948. In addition to Mr. Garrels, the managing committee of the Division will include W. N. Shepard, manager of industrial glues and resins of Plaskon Division, who is the retiring chairman, and R. G. Booty, assistant to the president of Interlake Chemical Corp.

New Testing Machine[1]

Progress in the research project sponsored by P.M.M.A. at Massachusetts Institute of Technology, and in particular details of the new testing machine, were announced to the industry during the meeting. The research project, now entering its third year, is directed toward a fundamental study of the engineering properties of plastics and has shown the need of design of specialized testing equipment. The new machine now in operation at M.I.T. is a combination of various types and is the first of its kind to take advantage of recent developments, particularly the use of servo mechanisms and electronic controls. This machine permits the precise measurements of physical properties of plastics, taking into consideration the importance of time as a primary function. It provides constant rates of stress, strain, cross-head motion, and load application and permits the continuous testing of a sample from tension to compression. Auxiliary equipment include freely suspended and self-aligning grips, a special bending jig, torsion and shear fixtures, and special extensometers operating through the servo mechanism.

The new machine together with specialized instruments for rapid determination of molecular weights and distribution opens new horizons in plastics testing and completes the instrumentation for the Institute to proceed to the main objective: the study of the mechanical stress-strain phenomena of plastics as related to their molecular structure. The testing machine should have application in testing other materials, such as rubber, metals, and wood products. The work at M.I.T. is being directed by a steering committee composed of Dr. Frederick for P.M.M.A. and Prof. A. G. H. Dietz of M.I.T. Technical members of the Association together with representatives of A.S.T.M. and S.P.I. have been assisting in this work.

[1] A paper on this testing machine was published in the December, 1947, issue of the *A.S.T.M. Bulletin*, p. 51.

Plastics Division Program

THE Division of Paint, Varnish and Plastics Chemistry, American Chemical Society, has announced further plans for its twenty-fifth anniversary meeting with the Society in Chicago, Ill., on April 19 to 23. A special program having the theme "From Art to Science" has been planned under the chairmanship of A. C. Elm. Four papers will review the greatest contributions of the Division during the past 25 years, as follows: C. E. Barnett, New Jersey Zinc Co. (of Pa.), will review the contributions of the pigment chemist; D. H. Wheeler, General Mills, Inc., will talk on the drying oil chemist; C. S. Fuller, Bell Telephone Laboratories, will discuss the work of the plastics and resin chemist; and M. Van Loo, Sherwin-Williams Co., will review the contributions of the test chemist and testing engineer.

This program will probably be held on Thursday afternoon, April 22, and will be followed by a social hour and banquet at which past chairmen of the Division will be guests. The Chicago Paint and Varnish Production Club has also been invited to attend this banquet, at which C. F. Rasweiler, Johns-Manville Corp., will speak.

On Thursday morning there will be a symposium on alkyd resins, including the following papers: "History and Development of Alkyds," by R. H. Kienle; "Theories of Alkyd Composition and Behavior," by K. A. Earhart; "Technology and Apparatus for Manufacture," by A. G. Hovey; and "Applications in Industry," by A. G. Beavers.

The Division has scheduled regular papers on plastics for April 21 and papers on coatings for April 23. The Palmer House has been designated as headquarters for the Division, and members are advised to secure reservations at the earliest possible date.

S.P.I. Handbook Issued

PUBLICATION of the "S.P.I. Handbook" was announced by George H. Clark, president of the Society of the Plastics Industry, at a cocktail party on January 8 at the Monte Carlo Restaurant, New York, N. Y. The 451-page tome is expected to assume a place as the authoritative work on the plastics industry and its affiliates. In preparation for four years, the book represents the cumulative efforts of 300 technicians and other authorities from more than 600 firms in the plastics industry. Six chapters were released as preliminary booklets during the past three years, but have been revised for the final publication. It was announced that the book will be revised as conditions warrant in order to keep pace with the expanding and progressing industry. N. J. Rakas, of National Automotive Fibres, Inc., was chairman of the handbook committees, and Charles L. Condit, of the S.P.I. central staff, was secretary. The book, which contains more than 500 charts and illustrations, is being distributed free to all members of the Society. Additional copies may be obtained at a price of $4.50 to members and $7.50 to non-members.

Hoover on Plastics Trends

IT IS expected that 1948 will be the first year since the war in which the supply of all major plastics materials will be nearly adequate to meet demand, said J. R. Hoover, president of the Plastic Materials Manufacturers Association, Inc., and vice president of B. F. Goodrich Chemical Co. Plant facilities projected and announced during 1945 and 1946 have now for the most part been brought into production or will have been by midyear.

The most critical supply problem facing the thermosetting material manufacturers is that of formaldehyde, although current supplies of phenol and urea are not much better. In general, thermoplastics are expected to be available in sufficient quantities to meet requirements. Certain types may be in short supply early in the year, but supplies should ease during the second quarter. Plasticizers for the vinyls appear to be the most critical problem in this field, Mr. Hoover said, and these shortages may persist throughout the year.

The plastics industry has gained great momentum and some degree of maturity, and its future appears to be unlimited by any known horizons, Mr. Hoover added. Many of its growing pains were self-corrective and stemmed largely from misapplications of plastics. A more conservative and specific approach to plastics advertising, publicity, and promotion has become apparent, and there is greater emphasis on functional and economical application. The use of plastics in combination with other materials holds promise for the future, as do the development of new material forms and improved and simplified methods of processing.

Reviews Industrial Progress

L. F. LIVINGSTON, manager of the extension department, E. I. du Pont de Nemours & Co., Inc., spoke on "Review of Progress" before a joint meeting of the Philadelphia Sections of the Society of Plastics Engineers and of the Society of the Plastics Industry on January 15 at Franklin Institute. The meeting, which was also a ladies' night, was preceded by a dinner tendered the speaker.

America has made 50 years of progress in 10 years by taking its inventors out of sheds and attics and putting them in modern research laboratories backed by ample funds, Dr. Livingston declared. The process of progress is both complicated and difficult and involves teamwork between research workers in many different fields, engineers, designers, toolmakers, administrators, investors, and workers. The speaker described the process by means of examples showing how rayon, nylon, and the plastics field have expanded into industries creating thousands of jobs and raising living standards. Many samples of chemical products were displayed by Dr. Livingston to document his thesis that progress is obtained by teamwork.

The subject with Dr. Livingston is to be reviewed again at a meeting of the Philadelphia Section, S.P.E., at the Franklin Institute on February 18.

S.P.I. Low-Pressure Industries Conference and Exposition

THE third annual technical session and exhibit of the Low-Pressure Industries Division, Society of the Plastics Industry, was held January 15 and 16 at the Edgewater Beach Hotel, Chicago, Ill. Approximately 400 attended the meeting at which, in addition to the technical sessions and 30 company exhibits of plastics products, there was a forum entitled "The Industry Asks Questions," and a banquet at which Ralph W. Carney, Coleman Co., spoke on "The Man Who Sells."

A special feature of the meeting was a "personal contact" period each day when an effort was made to bring together representatives of resin and filler manufacturers, mold and machinery producers, designers, consultants, molders and fabricators. William B. Darling, Riegal Paper Corp., was moderator at the "Industry Asks Questions" forum in which a panel of 10 members of the low-pressure fabrication and molding industry replied to questions from the audience on new developments, availability of materials, production methods, and other problems.

Seven papers were presented before the technical sessions at which Mr. Darling was chairman, and Robert J. Brinkema, Egmont Arens, Inc., was vice chairman.

Cecil W. Armstrong, consultant, gave a paper on "Continuous Laminating." After a description of the raw materials, including resins, catalysts, fillers, and cover sheets, Mr. Armstrong described the continuous laminating process in detail and compared it with the non-continuous process. The speaker emphasized the need of improved quality control and sound merchandising methods and predicted that continuous laminating with polyester resins will attain a prominent and respected place in the plastics industry.

"Design-Printed Papers for the Polyester Resin Laminating Industry" was the topic discussed by George R. Wallace, Decotone Products Division, Fitchburg Paper Co. Mr. Wallace gave a brief history of the development of design-printed papers for the polyester resin laminating industry. After a description of the gravure printing process, the speaker considered the requirements for the paper and ink used in this process. Mr. Wallace pointed out some of the major problems involved in the production of a satisfactory sheet for polyester laminating and then indicated possible solutions to these problems that would allow for greatly increased production.

"New Developments in Treating Cellulose Fibers for Polyester Laminates," by Arthur L. Smith, Resinous Products & Chemical Co., was the third paper on the program. In some respects the utilization of low-pressure or polyester resins and their techniques in already established fields has been neglected, Mr. Smith declared. For example, when polyester resins were used with cellulosic fillers, the lack of adequate resistance to moisture of the finished product was considered too great a deficiency for the electrical insulation industry. Resinous Products & Chemical has developed a method which largely eliminates this deficiency, Mr. Smith said, and gives polyester laminates equal or superior to currently available laminates for the electrical insulation industry. The speaker described this method which in essence consists of waterproofing the cellulose fiber to render it less polar or hydrophilic and thus make it more receptive to the relatively less polar contact resin.

F. L. Minnear, Shellmar Products Corp., in "Evaluation of Thermoset Laminated Sheet Products," reviewed his experience in both the high-pressure and contact-pressure laminating fields and compared the two processes and their end-products. The contact pressure laminates provide a wide range of flexibilities, color, and design, give maximum strength in Fiberglas laminates, and are made by continuous processes with consequent cost savings. High-pressure laminates, said Dr. Minnear, provide great strength, but are made by the batch process, require skilled process control, and give products rigid and normally dark in color.

The other papers presented before the technical sessions were: "Economics of Reinforced Plastics," by W. B. Wilkins, plastics consultant; "Developments in Catalysis and Processing of Polyester Resins," by D. G. Patterson, American Cyanamid Corp.; and "New Developments in Polyester Resins," by H. L. Gerhart, Pittsburgh Plate Glass Co. Abstracts of these papers are not available at present.

Cleveland S.P.E. Elects

NEW officers and directors of the Cleveland Section, Society of Plastics Engineers, Inc., were elected by written ballot at a meeting of the Section's board of directors on January 12, as follows: president, William Johnson, Plastic Engineering, Inc.; vice president, Hugh Winn, Case Institute of Technology; secretary, M. Scott Moulton, B. F. Goodrich Chemical Co.; treasurer, C. F. Saurwein, Goodyear Tire & Rubber Co.; and directors W. H. Nicol and W. Van Orman, both of Goodyear, F. C. Hyas, Chemical Rubber Co., F. J. Ackerman, Ackerman Plastic Molding Co., C. F. Waterfield, Brush Development Co., and the four new officers.

Pacific Coast S.P.I. Meeting

APPROXIMATELY 75 members and guests of the Pacific Coast Section, Society of the Plastics Industry, attended a meeting on January 23 at the Clark Hotel, Los Angeles, Calif. The first part of the meeting was devoted to a report of activities of the S.P.I. educational committee. The committee is taking an active interest in the education of employes of the plastics industry so that they can be used in suitable positions. The committee is also working on plans to educate plastics consumers at the buyer level in order to eliminate some of the misapplications of plastics that have occurred in the past.

The second part of the meeting consisted of a talk by Marie Bentivoglio, of Celanese Corp., on "Some New Uses of Cellulosic Plastics." Dr. Bentivoglio showed samples of new applications and explained their use. Among the products displayed were: (1) wallpaper coated or laminated with an embossed film of cellulosic plastic which gives a matte finish that can be readily cleaned; (2) compacts made from Saran mesh coated with cellulose acetate and then metallized; (3) a flame resistant cellulose acetate molding compound which has good molding and electrical properties and an excellent finish; (4) ethyl cellulose for repairing bowling pins by injection molding, said to increase the life of the pins by as much as tenfold; (5) a hollow, transparent, cellulose acetate fish lure in which a live minnow and some water are placed to provide realism; (6) imitation pearl earrings and beads made from extruded cellulose acetate and coated with special lacquers to give a pearl-like finish; (7) cellulose acetate packaging film for new applications, including hosiery; and (8) Forticel plastic which gives dimensionally stable, rigid, and easily machinable products suitable for use in spectacle frames.

Philadelphia S.P.E. Meetings

THE Philadelphia Section, Society of Plastics Engineers, held its regular monthly meeting on December 16 at its meeting place, the Franklin Institute. As usual, the meeting was preceded by a dinner tendered to the speaker and held in the Institute's Dairy Dell. Speaker of the evening was John C. Graf, of John C. Graf Co., who gave a talk emphasizing the important part hydraulic presses play in the production of both peacetime and wartime products. This talk was illustrated by slides showing presses made as far back as 1900 and by a display of different types of products made on hydraulic presses. After the talk a film, "Watts in Glass," was shown through the courtesy of the Owens Corning Fiberglas Corp., followed by a question and answer period conducted by John H. Clark, of Owens Illinois Glass Co. The group's next meeting, a ladies' night, will take place January 15.

The Section's preceding meeting had been held on November 18. Speakers were G. H. Mains, research director, Phenolite division, National Vulcanized Fibre Co., and G. H. Sollenberger, Rohm & Haas Co. Mr. Mains discussed new developments and products in the field of laminated phenolic plastics. Mr. Sollenberger gave an interesting talk on special developments in Plexiglas acrylic plastics. He stressed the more difficult specifications now being formulated for heat resisting acrylics and said that these requirements have necessitated the developments of further modifications and improvements. Mr. Sollenberger also displayed sample parts illustrating certain departures from standard injection molding procedure, such as heat resistance, greater clarity, and improved moldability. Following the talks, a film entitled "Science Spins a Yarn" was shown through the courtesy of American Viscose Corp.

At the Section's meeting on October 21, Guy R. M. del Guidice, patent attorney for Socony-Vacuum Oil Co., spoke on the patent system. He traced the development of our patent system and discussed its provisions in great detail, emphasizing the interests of the inventor.

Redman on Product Development

A TALK on "Product Development in Plastics," by Robert E. Redman, instructor in industrial design, Rhode Island School of Design, was the feature of a meeting of the Rhode Island & Southeast Massachusetts Section, Society of Plastics Engineers, Inc., on January 14 at the Providence Engineering Society Bldg.

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Scientific and Technical Activities

Washington Chemical Engineers Meet on Rubber

THE Chemical Engineer's Club of Washington, D. C., an independent organization formed less than a year ago, held a symposium on "The National Rubber Situation" in the auditorium of the Chamber of Commerce Bldg. in that city on January 13. The program, arranged by Phillip H. Groggin, of the Club, consisted of talks by a distinguished panel of experts, followed by questions from the floor. Admiral C. E. Braine, chairman of the Army-Navy Munitions Board Rubber Committee, acted as moderator. An audience numbering at least 300 persons evidenced active interest in the talks, and many took part in the discussion period following the formal program.

A cocktail party and dinner at the Lafayette Hotel preceded the symposium for members of the Club, the speakers, and guests. Officers of the Chemical Engineer's Club of Washington introduced at the dinner are: president, Russell S. McBride (absent because of illness); vice president, John T. Cox, Jr.; secretary, Randall D. Sheeline; treasurer, Dewitt O. Myatt; program chairman, Dr. Groggin; and chairman of committee in charge of arrangements, Paul S. Forsyth. John Livingston, formerly of Office of Rubber Reserve, RFC, and a leading chemical engineer who contributed much to the development of the American synthetic rubber industry, spoke briefly at the dinner meeting.

The titles of the papers presented at the symposium and the authors and their affiliations were as follows:

"A Statement of the Rubber Problem from the Viewpoint of National Defense," Admiral Braine.

"International Implications of the Rubber Problem," Wm. T. Phillips, International Resources Division, United States Department of State.

"Present Technological Status and Future Outlook for Synthetic Rubber," John P. Coe, vice president, United States Rubber Co.

"The Synthetic Rubber Industry and Its Relation to Our National Economy," G. B. Hadlock, director, ORR.

"Stabilizing the Domestic Rubber Industry," R. P. Dinsmore, vice president, Goodyear Tire & Rubber Co.

"The American Synthetic Rubber Industry from the Viewpoint of the Congress," Hon. Fred Crawford, Congressman from Michigan and chairman of Subcommittee #3 on Rubber, Armed Forces Committee.

Defense Viewpoint, by Admiral Braine

In the first paper, by Admiral Braine, it was explained that the Army-Navy Munitions Board had the responsibility for developing plans for industrial mobilization in the event of another war. The cooperation of the professional societies, industry, and labor in this work was acknowledged.

With regard to synthetic rubber, it was mentioned that improvements in this material in this country in recent years were astounding. Present indications are that rubber products for some time to come will be made of a blend of natural and synthetic rubbers, and for this reason an adequate natural rubber stockpile and a readily available synthetic rubber industry, the latter at least in standby condition, are necessary, it was emphasized.

The Navy can keep the sea lanes open, but cannot guarantee the production and shipment of natural rubber from the producing areas. The work on the development and production of guayule rubber in this country will therefore be continued by the Navy Department, with the Department of Agriculture responsible for most of the actual work.

Mention was made of the bill proposed by the Army-Navy Munitions Board and the opposition which developed to some of the recommendations of this bill. The major difficulty was the lack of agreement between industry and government as to the percentage of the synthetic rubber industry that should remain active and the means of maintaining this active part of the industry in time of peace. This speaker was very much in favor of continued production of synthetic rubber in the United States as important for our national security, but indicated that the Army-Navy Munitions Board is concerned mostly with insuring an adequate supply of rubber products, as such, while the responsibility for the production of synthetic rubber, itself, was that of the National Security Resources Board.

Attitude of the State Department

The Department of State has as its major responsibility the prevention of war and in this connection is concerned with the economics of many nations throughout the world as these economics are affected by policy and actions as decided upon by the United States, Mr. Phillips said. Public Law 520 of the 79th Congress requires that our natural rubber stockpile cannot be used to influence commodity markets, and it is stated that similar requirement should be made for any synthetic rubber stockpile. The Department of State favors limiting mandatory use of synthetic rubber in order to avoid depressing the economies of other countries.

Reciprocal trade agreements were also supported, and mention was made of the plans of the natural rubber producers in the Far East to increase production. The success of the Department of Agriculture in its program to control leaf blight in South America was listed as a factor which will also contribute to the eventual world surplus of natural rubber.

The agreements being worked on by the International Trade Organization were viewed as a major step toward preventing future wars because of their ability to maintain the economies of the participating nations in a satisfactory condition.

Technological Status and Future Outlook

In his talk Mr. Coe first explained that he would deal with the uses of synthetic rubber rather than the chemistry and physics of this new raw material. It was explained that such uses would be continuous since they were now well established.

The development and properties of some of the synthetic rubbers, including neoprene and GR-S, were reviewed, and reference was made to the 2¼ million tires made with GR-S that had provided good service during the last several years, during both war and peace. Engineers believe natural rubber tires to be about 15% better than those made with GR-S, but it was said that this point may or may not be of importance. At any rate, a complete change to all natural rubber tires is not likely. At a lower price, more GR-S will be used in tire production. Difficult processing is no longer a problem with GR-S; in fact wire and cable, tiling, battery, and coated goods manufacturers prefer GR-S to natural rubber, the first mentioned industry even at a higher price. Of course certain disadvantages of GR-S still persist, particularly its lower strength and tack as compared with natural rubber.

In the field of recent developments in GR-S, the advantages of the carbon black masterbatches were briefly discussed. One of the most promising modifications of standard GR-S is this type rubber polymerized at between 0 and 40° F. Developed as a result of research conducted by the synthetic rubber industry under sponsorship of ORR, preliminary tests indicate that this new GR-S is at least the equal of natural rubber in tensile strength and elongation. In resistance to flex-cracking and in abrasion resistance it is expected to be superior to natural rubber. Parts of two plants are now being equipped to produce this new synthetic rubber, one the plant operated by U. S. Rubber at Borger, Tex., and the other the plant operated by Copolymer Corp. at Baton Rouge, La. Until recently the production of GR-S at such low temperatures was impractical because of the effect of the reduced temperature on the polymerization rate. The discovery of a combination of four low-temperature polymerization accelerators has made possible a polymerization time of 12 hours. These chemicals are cumene hydroperoxide, an oxiding agent; invert sugar, a reducing agent; sodium pyrophosphate and ferrous sulfate, activating agents. The added cost to produce this new GR-S was only a fraction of a cent a pound, the speaker said.

It was emphasized that research on synthetic rubber must be continued either by government or private industry in order that further technical advances may be realized.

In conclusion Mr. Coe stated that in his opinion synthetic rubber has now proved itself technologically and that it will continue to be manufactured and used on its own merits as a raw material required by industry.

Relation to National Economy

In stressing the importance of synthetic rubber to our national economy, Mr. Hadlock referred to the difficulties of our supply position before the late war due to the cartelization of natural rubber producing industry, the wartime scarcity of rubber before the synthetic plants began operation, and the $130,000,000 cost of the 100,000 long tons of natural rubber secured during the war from the Amazon Valley. In contrast he pointed to the adequate availability and stabilized price of synthetic rubber at the present time which is in addition to the unparalleled war service performed by the synthetic rubber industry. Horizons are unlimited for the synthetic rubber industry, but the term "synthetic" should be dropped, it was said. The present temporary shortage of GR-S is due to human error on the part

of both industry and government in incorrectly estimating the length of time the high level demand for rubber products would continue.

Mr. Hadlock also mentioned the high earnings of the rubber goods industry and said that they were due to a considerable degree to the stabilized low price and regular supply of GR-S to that industry.

Stabilizing the Domestic Industry

In his opening remarks Dr. Dinsmore said that it is generally agreed that we cannot rely upon natural rubber imports in a future emergency, but should preserve the synthetic rubber manufacuring capacity and skill, together with knowledge of how to use it, against any such future emergency. Synthetic rubber production for the next two years of 275,000 long tons a year is believed the minimum requirement for national security. There will also be required a stockpile of natural rubber which may be as much as 800,000 long tons, he said.

Dr. Dinsmore declared further that it seems obvious that the requirements of national security require, for a time, government controls generally obnoxious to private industry. If synthetic rubber could compete with natural rubber in cost and quality, there would be no problem. This, however, is not the case, and there is no assurance that it would be brought about by any private operation in prospect.

Wide discussion has failed to evolve any more feasible scheme for insuring the use of minimum amounts of synthetic rubber than by continuing present specifications for small tire transportation items. Mandatory use, however, should be limited to these items by law, subject to change only by Congress after recommendations by a joint committee of the rubber industry, and the supervising government agency. The importation of such tire items should be subject to prevailing specifications, and export should be permitted free from such specifications, it was said.

If proper pricing policies were to be adopted, it is doubtful whether either industry or the tire-consuming public would suffer by government operation of the synthetic plants in comparison with operation by private enterprise. Dr. Hadlock has stated that GR-S could be produced for an out-of-pocket cost of about 14½¢ a pound, but that other necessary charges brought the cost up to or above the 18½¢ a pound selling price.

Dr. Dinsmore pointed out that if legislation permitted Rubber Reserve to cut these additional charges to around 1¢ a pound, as industry recommends, the rubber could be sold at 15½¢ to 16¢ a pound, thus extending the period of time over which GR-S would be competitive. On the other hand, if private industry produced GR-S, profits on the major raw materials and the rubber would have to be added, and there seems to be little hope, by use of present plants and under present conditions, of equaling or bettering a government cost. The probabilities are that the costs in private plants, for some time forward, would be at least 1¢ a pound higher, Dr. Dinsmore said.

We may as well recognize the unpalatable fact that by every indication, both from our own work in this country and from what we know of the Germans' work, it is unlikely that the GR-S type of rubber will ever be entirely competitive. It is probable that the competitor for natural rubber must come from new undeveloped fields of polymer chemistry, while GR-S takes its place as just another obsolete weapon of the late war, it was concluded.

Attitude of Congress

The need of Congress to obtain the viewpoints of the government's Departments of State and National Defense, the industry, the public, and the consumers of rubber products in considering the preparation of legislation on a national rubber policy was first explained by Representative Crawford.

Factors involved in such legislation were enumerated as: (1) The national security problem. (2) Plant disposal policy to include which plants may be sold and which may not. (3) Congressional specification for minimum tonnage, both active and standby. A total tonnage of 600,000 of GR-S and 75,000 of GR-I was indicated, and mandatory use for a limited period of 200,000 tons of GR-S and 25,000 of GR-I, mentioned. (4) Patent pooling and exchange of information agreements. These will probably be continued. (5) Research and development to be carried on by agencies to be designated by the President and with money appropriated by the Congress. (6) Provide for a single agency to be designated by the President to administer all aspects of the rubber program. (7) Import and export regulations for rubber products; imports possible only if products meet U.S.A. natural-synthetic content specifications, no restriction on exports.

Representative Crawford emphasized that Congress had a major responsibility to the people of this country in formulating rubber policy legislation and therefore in view of the amount of money involved would insist that no synthetic plants be sold without approval of the Congress in the form of a concurrent resolution.

California Group Elects

ELECTION of officers and directors of the Northern California Rubber Group took place at the Group's annual Christmas Party on December 8, at the Willows Tavern, Orinda. The following officers were elected: president, Ross E. Morris, Mare Island Naval Shipyard; vice president, Edward P. Coxhead, Pioneer Rubber Mills; secretary, Victor F. Sagues, Plant Rubber & Asbestos Works; treasurer, Neil McIntyre, Oliver Tire & Rubber Co.; and directors, Fred W. Swain, Pioneer Rubber, Russell D. Kettering, Oliver Tire, Robert J. Henderson, American Rubber Mfg. Co., and George B. Farwell, Goodyear Tire & Rubber Co.

Approximately 110 members and their wives attended the party which featured a dinner, an evening of dancing, entertainment by various members of the Group, and the distribution of numerous door prizes. The Group's next regular meeting will be held on January 29 at the Hotel Claremont, Oakland.

Ross E. Morris

C.C.D.A. Annual Meeting

THE Commercial Chemical Development Association will hold its annual meeting in the Roosevelt Hotel, New York, N. Y., on March 9 and 10. The business meeting will be held on March 9 and the financial aspects of chemical development will be discussed at the morning meeting and luncheon on March 10.

A technical session is scheduled for the afternoon of March 10 to cover the gearing of commercial chemical development to sales, research, and manufacturing. There will also be a social hour followed by a dinner at which management's appraisal of commercial chemical development will be given. Lauren B. Hitchcock, Quaker Oats Co., is president of the Association; James H. Boyd, consultant, is chairman of the general program committee; and John B. Calkin, Union Bag & Paper Corp., is chairman of the New York meeting. W. E. Kuhn, of The Texas Co., is chairman of public relations for C.C.D.A.

A. P. S. High-Polymer Meeting

THE Division of High-Polymer Physics of the American Physical Society held its regular 1947 meeting on December 29 at the Palmer House, Chicago, Ill. The Division meeting was part of a joint meeting of the A.P.S. with the American Association for the Advancement of Science. More than 150 members attended the high-polymer sessions, at which 18 papers were presented. Abstracts of these papers of interest to the rubber industry were printed in our December issue, pages 367-68.

At the Division's business session the following officers were elected: chairman, Hubert M. James, Purdue University; vice chairman, Richard B. Stambaugh, Goodyear Research Laboratory; secretary, W. James Lyons, Firestone Research Laboratory; and treasurer, Robert S. Spencer Dow Chemical Co. Mr. Lyons was re-elected to the executive committee, and Dr. Stambaugh was elected to the committee to fill the other vacancy. Four amendments to the Division's by-laws were adopted and submitted to the Society council for approval. The program committee, headed by J. W. Liska, Firestone Tire & Rubber Co., was extended a vote of thanks for its work. The Division's 1948 meeting is expected to be held in New York, N. Y., some time late in the year.

Southern Ohio Group Party

THE annual Christmas party of the Southern Ohio Rubber Group was held on December 18 at the Miami Valley Country Club, Dayton, and was attended by some 149 members and their wives. Dinner was followed by a program of entertainment and the distribution of Koroseal raincoats to the ladies present. A drawing for liquor prizes was also held by the members. Following the drawing came dancing with cards and tables avail-

able for those who did not care to dance. The party was voted a huge success, and there were many requests for a similar meeting to be held in the near future.

The Group's next dinner and technical meeting will be held February 20 at the Engineer's Club of Dayton. The speaker for this meeting and his topic will be announced at a later date.

The Southern Ohio Group has also announced the results of a letter ballot for officers and directors for 1948, as follows: chairman, R. S. Radow, Dayton Rubber Co.; chairman-elect, J. L. Fitzgerald, Premier Rubber Mfg. Co.; treasurer, H. H. Wolfe, Dayton; secretary, R. J. Hoskin, Inland Mfg. Division, General Motors Corp.; directors for three years, G. W. Yohe, Inland, A. J. Marshall, Naugatuck Chemical Division of United States Rubber Co., and H. R. Gill, Goodyear Tire & Rubber Co.; directors for two years, H. E. Wening and E. C. Dill, both of Inland, and J. Rockoff, Dayton; and directors for one year, S. L. Brams, Dayton Chemical Products Co., H. W. Bell, Firestone Tire & Rubber Co., and R. B. Appleby, E. I. du Pont de Nemours & Co., Inc. The Group's membership committee will be announced in the near future.

Hycar P.A.—New American Rubber

HYCAR P.A., a new-type American rubber that can be compounded and vulcanized in a wide range of soft to hard compositions, has been announced by B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O., through J. R. Hoover, vice president in charge of sales. The new product is an elastomeric polyacrylic ester resembling natural, pale crepe rubber in appearance. The vulcanized forms show outstanding resistance to heat, oils, ultraviolet light, ozone, and gas diffusion, and the non-rigid compounds show extremely good flexing life, it is claimed. Compounding, molding, extruding, calendering, and curing operations can be readily accomplished with standard rubber processing equipment.

Available in both dry and latex forms, Hycar P.A. in the unvulcanized state is expected to find many applications as an adhesive and for coating and impregnating papers and fabrics. Vulcanized products have shown outstanding performance as heat resistant coatings for fabrics, heat and oil resistant gaskets, hose, belting, oil seals, and other mechanical applications. The ester also shows promise as an insulation coating for electric motor coils and as a jacket for electric wires.

Now in semi-works production, Hycar P.A. was developed after many years of experimental work. Patents covering processes of vulcanization have been issued to Goodrich and will be made available to licensees. These processes make possible the manufacture of rubber products that will withstand operating temperatures considerably above those of conventional rubbers. When tested under an electric iron at 400° F. for eight hours, the new product showed no apparent loss in properties, unlike older-type rubber compounds which deteriorated in a much shorter time. After 720 hours at 300° F., the polyacrylic ester shows a change in elongation of only 35%, compared with 75% in seven hours for good rubber compounds. As for ozone resistance, the new rubber is less affected after 600 hours' exposure than is rubber after six seconds' exposure.

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution to rubber goods manufacturers together with certain reauthorizations of previously listed polymers from the Office of Rubber Reserve, RFC, under the conditions outlined in our November, 1945 issue, page 237, have been received and listed in the table which appears below.

Normally, experimental polymers are produced only at the request of the consumers, with 20 bales of the original run set aside for distribution to other interested companies for their evaluation. Such rubber is available in quantities of one bale to two bales upon request to the sales division of Rubber Reserve within six months after the experimental polymer was produced. Subsequent production runs are made if sufficient requests are received.

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-412-GR-S	Goodrich, Port Neches	10/3/47	GR-S-10.	To be used as standard reference bale starting January 1, 1948.
X-413-GR-S	General, Baytown	about 11/17/47	GR-S Black-1 stabilized with 1.5 parts Stalite.	Relatively non-staining type of GR-S latex masterbatch containing 50 parts EPC black. Discoloration would not be a factor in a black masterbatch.
X-414-GR-S	Firestone, Akron	11/28/47	Standard GR-S at 90 to 110 Mooney viscosity. Product heat softened in drier to 35 to 50 Mooney viscosity.	
X-415-AC GR-S	Firestone, Lake Charles	11/12/47	71-29 butadiene-styrene charge ratio polymer, fatty acid soap emulsification and modified with tertiary C-16 mercaptan at 25 to 35 Mooney, stabilized with 1.5 parts Stalite, and alum coagulated.	Low Mooney polymer made to reduce or eliminate breakdown time before compounding. Of immediate interest to chemically blown sponge producers.
X-416-GR-S	U. S. Rubber, Borger	11/3/47	X-344 GR-S latex made by continuous polymerization. Stabilized with 1.5 parts IBUL.	A non-staining and non-discoloring, cross-linked GR-S of the GR-S-60 type. X-416 will have similar excellent processing properties as judged by extrusions, molding and calendering as associated with GR-S-60 and X-344.
X-417-GR-S	U. S. Rubber, Naugatuck	11/14/47	55-45 butadiene-styrene charge ratio, emulsified with mixed rosin soaps (X-358 latex), stabilized with 0.75-part Stalite and coagulated with salt and acid. No Mooney specified although should be within range of 50 to 75. Standard GR-S.	
X-418-GR-S	Goodyear, Torrance	11/5/47		To be used as standard reference bale starting January 1, 1948.
X-419-GR-S	General, Baytown	January, 1948	A 50-part Philblack A latex masterbatch with 100 parts of GR-S having a Mooney of 37 ±4 and stabilized with 1.25 parts Stalite.	A non-staining-type latex masterbatch of an HMF black. Should have the excellent processing and physical properties usually attained with this type black. Should be of unusual interest for all kinds of mechanical goods, etc. Similar masterbach with EPC black was made as X-413-GR-S.
X-420-GR-S	General Baytown	12/12/47	A 50-part Philblack 0 latex masterbatch with 100 parts of GR-S having a Mooney of 37 ±4 and stabilized with 1.25 parts PBNA; otherwise similar to GR-S-Black 1.	A GR-S-Black 1 type of masterbatch containing a new very fine furnace black attributed to impart approximately equivalent tread wear and better processing than EPC black. All consumers interested in evaluation lots up to 5,000 pounds should advise the Sales Division of Rubber Reserve immediately.
X-421-GR-S	Firestone, Lake Charles	January or February, 1948	A 25 to 35 Mooney GR-S-AC (alum coagulation) modified with tertiary C-16 mercaptan and stabilized with 1.5 parts of UBUB.	This non-staining, non-discoloring GR-S will be similar to X-415-GR-S except for stabilization and should be superior to X-415 in these above noted properties. Scheduled primarily for chemically blown sponge, but should offer improved processing (reduced breakdown costs) for practically all applications now using GR-S-20AC and GR-S-45AC.
X-422-GR-S	U. S. Rubber, Borger	12/9/47	GR-S-17 shortstopped with hydroquinone.	The present shortstopper being used with EFED (non-staining and non-discoloring) GR-S is causing excessive corrosion in plant equipment. Similar steps may be necessary with other EFED types such as GR-S-25, GR-S-40AC, and GR-S-45AC in the very near future.

X-Number	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-423-GR-S	Goodyear, Houston	12/8/47	X-385-GR-S (Standard GR-S stabilized with 1.5 parts R-2015; shortstopped with hydroquinone.	This non-staining, non-discoloring type GR-S is being made to combat excessive corrosion to plant equipment as indicated under X-422-GR-S.
X-424-GR-S	Goodyear, Torrance	12/12/47	Standard GR-S except that fatty acid soap and conversion will be reduced and Mooney increased to about 65. PBNA used as stabilizer.	Higher Mooney GR-S appears to give better tread wear, and lower conversion usually results in improved processing. To be evaluated in tires.
X-425-GR-S	Goodyear, Torrance	12/12/47	GR-S-10 except that rosin soap and conversion will be reduced and Mooney increased to about 60. PBNA used as stabilizer.	Higher Mooney GR-S appears to give better tread wear, and lower conversion usually results in improved processing. To be evaluated in tires.
X-426-GR-S	Firestone, Lake Charles	12/11/47	GR-S-AC except that Stalite will be used as the stabilizer.	Replacement for GR-S-AC as a result of serious PBNA shortage. Consumers normally using GR-S-AC are urged to use X-426-GR-S wherever possible. May offer advantages in those applications where alum coagulated GR-S is desired with relatively non-staining characteristics. Will have low water absorption and other properties similar to GR-S-AC.
X-427-GR-S	Goodrich, Port Neches	12/24/47	Continuous GR-S-10 at lower conversion and stabilized with 1.25% Stalite. GR-S-10 stabilized with Stalite is GR-S-18.	Some consumers find that lower conversion GR-S polymers give better processing. For January production.
X-428-GR-S	U. S. Rubber, Borger	1/12/48	GR-S-16 stabilized with 1.5% EFED instead of Stalite. This is a rosin soap emulsified GR-S having a 95 to 105 Mooney range.	For January production.
X-429-GR-S Latex	U. S. Rubber, Naugatuck	12/29/47	GR-S-85 latex with a contained polymer Mooney range of 105 to 120.	For January production. Specification limits: pH, 8.5-9.25; residual styrene, 0.50% maximum; total solids, 26.5-29.0%
X-430-GR-S	Goodrich, Port Neches	12/30/47	Continuous GR-S-10 at lower conversion and stabilized with 1.25% PBNA.	Only difference between X-430-GR-S and X-427-GR-S is in stabilizer. For January production.
X-431-GR-S	Goodyear, Houston	About 1/20/48	GR-S-20 latex stabilized with R-2015 and coagulated by special dilute alum technique to keep water soluble materials to an absolute minimum. Mooney range expected to be from 50 to 58.	A non-staining, non-discoloring, and lower Mooney variation of X-361-GR-S. X-431-GR-S, when properly compounded, will have extremely low water absorption comparable to deproteinized natural rubber. Should be evaluated for all applications demanding low water absorption and long retention of electrical properties. Price same as Standard GR-S. For February production.

Chicago Group's Christmas Fete

THE largest attendance in the history of the Chicago Rubber Group, more than 800 members, their wives, and guests, were present at the Group's annual Christmas Party on December 19, in the Morrison Hotel, Chicago, Ill. The program consisted of a cocktail hour, a turkey dinner, and a two-hour floor show of outstanding night club acts, followed by an evening of dancing. The ladies were presented silk scarfs with the compliments of the Group.

The committee in charge of arrangements for the party consisted of William H. Lussie, R. T. Vanderbilt Co., chairman; Paul Van Cleef, Van Cleef Bros., Inc.; Warren Bickel, Diamond Wire & Cable Co.; Ralph Anschuetz, Witco Chemical Co.; Douglas P. Johnstone, General Latex & Chemical Co.; Robert L. Campbell and James P. Sheridan, both of New Jersey Zinc Sales Co.; Harry L. Anderson, George S. Mepham Corp.; and Alfred L. Stein, H. Muehlstein & Co. The officers and committee members expressed their appreciation for the contributions of some 107 rubber manufacturing and supplier companies.

Rubber Technology Conference Scheduled for London in June

THE Institution of the Rubber Industry has announced that it will hold the second International Rubber Technology Conference on June 23 to 25 at the Central Hall, Westminster, London S.W.1, England. It is expected that this conference will be an even greater success than the first, held in 1938 and attended by 553 delegates of whom 198 were from overseas and represented 24 different countries. More than 100 papers were presented at the first conference and later published in the "Proceedings of the Rubber Technology Conference, 1938."

The forthcoming conference will cover the following subjects: natural and synthetic rubber latices; chemistry of rubber; physics of rubber; testing and analysis; synthetic rubbers; compounding ingredients; fibers and textiles; and developments in factory processes and products since 1938. The committee in charge has issued invitations to numerous well-known technologists all over the world to present papers at the conference, but other contributions are also invited.

After the conference the papers and full details of the meeting will be published as "The Proceedings of the Rubber Technology Conference, London, 1948." Copies of this book will be issued free to all registrants at the conference, and extra copies will be available for sale generally at £2/2/0 each. The registration fee for the meeting will be £2/2/0, and application forms and further details may be obtained from the Conference Secretary, Institution of the Rubber Industry, 12 Whitehall St., London S.W.1, England. The Conference Secretary will make hotel arrangements for registrants and will assist generally. The Council of the I.R.I. extends a cordial invitation to all those interested, either at home or abroad, to attend the conference.

Pauling A. C. S. President-Elect

LINUS C. PAULING, chairman of the division of chemistry and chemical engineering of the California Institute of Technology and one of the world's leading theoretical chemists, has been elected president of the American Chemical Society for 1949. Dr. Pauling took office as president-elect of the Society on January 1, when Charles A. Thomas, executive vice president and technical director of Monsanto Chemical Co., became president. Dr. Pauling was chosen by the Society's Council from four nominees after receiving the largest number of votes in a national mail ballot of the Society's 55,000 members.

Emil Ott, director of research for Hercules Powder Co., Wilmington, Del., has been elected to the board of directors of the A. C. S. for a three-year term. Dr. Ott succeeds Edward R. Weidlein, director of the Mellon Institute for Industrial Research, as regional director for the Society's third district, embracing Pennsylvania, Ohio, and Delaware.

Clarify Rubber for Use in Tubes

RUBBER ORDER R-1 prohibits the use of natural rubber in the manufacture of 6.00, 6.25-6.50, and 6.50 tubes of 15- and 16-inch diameters. Since the new-size designations differ from those named in R-1, some confusion has arisen regarding the type of material to be used by the manufacturers. On January 9 the OMD issued a letter clarifying this situation.

The provisions of List 9, paragraph (a) (1), of R-1 apply to the old sizes 6.00 through 6.50 and to the new-size designations replacing the old sizes, even though the new designations range above 6.50. The table below may be used as a guide in determining whether natural or Butyl rubber may be used in tube sizes listed:

New Size Designation	Size Replaced	Rubber Allowed
6.40-15	5.50-15-16	Natural
6.40-15, 6.00-15*	6.00-15	Butyl
6.70-15	6.00-16	Butyl
7.10-15	6.25-16	Butyl
6.70-15, 6.50-15*	6.50-15	Butyl
7.60-15	6.50-15-16	Butyl
7.60-15, 7.00-15*	7.00-15	Natural
8.20-15	7.00-15	Natural
8.20-15, 7.50-15*	7.50-15	Natural
8.90-15	7.50-15	Natural

*Some dual markings are shown because certain tubes may show both the old and new sizes.

Rubber Division Meeting

THE spring meeting of the Division of Rubber Chemistry, American Chemical Society, will be held on April 21 to 23 in Chicago, Ill., with the first session starting at 2:00 p.m. Wednesday, April 21. The Division's sessions will be part of the general A. C. S. meeting, April 19 to 23. Divisional headquarters will be at the Hotel Sherman, and reservations should be made at the earliest opportunity.

R. C. Dale, Inland Rubber Corp., is chairman in charge of all local arrangements, and the committee plans to hold the usual banquet in the Grand Ballroom of the Hotel Sherman on Thursday, April 22, following a general cocktail party in the Louis XVI and Crystal Rooms. The cocktail party is being arranged by a committee of suppliers under the chairmanship of C. M. Baldwin, United Carbon Co.

The Division's fall meeting will be held at the Book-Cadillac Hotel, Detroit, Mich., on November 8 to 10, and will not be held in conjunction with any of the regular A. C. S. regional meetings.

Rubber Division 25-Year Club

H. A. Winkelmann, of Dryden Rubber Division, Sheller Mfg. Corp., and chairman of the 25-Year Club committee of the Division of Rubber Chemistry, A. C. S., has announced that the first luncheon of the Club will be held Wednesday noon, April 21, at the Sherman Hotel, Chicago, Ill. in connection with the meeting of the Rubber Division. The luncheon chairman is R. P. Dinsmore, Goodyear Tire & Rubber Co. The luncheon is being held to enable the old timers of the Division to get together and maintain old contacts and friendships. It will also encourage a continued interest of the old timers in the activities of the Rubber Division, and, in turn, the Division will also benefit by the cooperation of its older members.

All members of the Division of Rubber Chemistry are invited to attend the luncheon. Reservation cards have been sent to members of the Division, and checks for $3.50 for each reservation should be sent to H. A. Winkelmann, 419 Oakdale Ave., Chicago, Ill. Eligibility for membership in the 25-Year Club will depend on the applicant's own statements in many cases, because the old membership lists are not available, Dr. Winkelmann said.

The organizing committee for the 25-Year Club consists of S. Collier, Johns-Manville Corp.; W. Vogt, Goodyear; and Dr. Winkelmann. The committee for the luncheon comprises, in addition to Drs. Winkelmann and Dinsmore, E. B. Curtis, R. T. Vanderbilt Co.; W. O. Hamister, Naugatuck Chemical Division, United States Rubber Co.; N. A. Shepard, Calco Chemical Division, American Cyanamid Co.; and B. R. Silver, N. J. Zinc Co.

C.I.C. Annual Conference

THE annual conference of the Chemical Institute of Canada will be held June 7 to 10, with headquarters at the Mount Royal Hotel, Montreal, P. Q. Plans are being drawn for a technical session of the Institute's Rubber & Plastics Division during the conference. Canadian rubber and plastics technologists are invited to present papers at this session. Such papers should be based on original work, although review papers will also be given consideration. Authors desiring to present papers before the Division should submit by March 1 the following information to J. T. Black, secretary-treasurer, Rubber Division, Chemical Institute of Canada, 137 Wellington St., W., Toronto, Ont., Canada: title of paper; abstract of paper (100 words); outline of paper (up to 500 words); and a short personal biography.

Redman on Product Development

(*Continued from page 625*)

This talk consisted of five parts: (1) what product design consists of; (2) how industrial design is taught at his school; (3) the procedure followed in an actual problem in industrial design; (4) what the school cannot provide; and (5) what product design can do for your product. The speaker defined industrial design as the giving of a fine appearance to mass production items, merchandised products, and even handicraft. A good industrial designer takes environment, function, material, manufacturing process, economic considerations, and appearance into proper account when doing design work.

New officers and directors of the Section were elected at the business session after the talk, as follows: president, N. Angell, Angell Electroforming Corp.; vice president, A. Richardson, Lloyd Products Co.; treasurer, R. Jacobs, Cranston Molding Co.; secretary, A. Terpak, Modern Plastics Engineering Co.; directors for three years, R. Bruce, Bakelite Corp., F. Murphy, Standard Plastics, Inc., and Mr. Terpak; directors for two years, Messrs. Richardson, Jacobs, and Angell; and directors for one year, J. Stenberg, Plastimold, Inc., D. Kirk, Monsanto Chemical Co., and R. Riley, Firestone Rubber Products Co. W. Dunnigan, Durite Plastics, Inc., was elected as the Section's representative to the Society's national council. Messrs. Richardson and Jacobs were appointed as the Section's credential committee; Mr. Bruce was chosen chairman of the program committee, and Mr. Stenberg chairman of the membership committee.

S.P.I. Convention and Show

THE annual meeting of the Society of the Plastics Industry will be held on May 20 and 21 at the Ambassador Hotel, Atlantic City, N. J., it was announced by William T. Cruse, the Society's executive vice president. This spring meeting will include merchandising, technical, and business sessions. The Society's directors have decided to hold the conference separately from the National Plastics Exposition this year in order to enable industrial and commercial leaders to concentrate entirely upon the conference meetings, Mr. Cruse explained.

The third National Plastics Exposition will be held at Grand Central Palace, New York, N. Y., September 27 to October 2. The exposition committee will send out plans for the show in the near future, and prospective exhibitors will receive applications for space. There may be a few meetings during the exposition, but the Society's main business sessions will be held at the Atlantic City meeting.

CALENDAR

Feb. 1-6.	National Sporting Goods Association. 1948 Convention. Hotel New Yorker, New York, N. Y.
Feb. 3.	Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Feb. 6.	Akron Rubber Group.
Feb. 6.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Feb. 11.	Newark Section, S.P.E.
Feb. 11.	Rhode Island and Southeastern Massachusetts Section, S.P.E.
Feb. 12.	Central Ohio Section, S.P.E.
Feb. 12.	Quebec Rubber & Plastics Group. Ritz Carlton Hotel, Montreal, P. Q., Canada.
Feb. 13.	Connecticut Rubber Group. R. T. Vanderbilt Laboratories, East Norwalk, Conn.
Feb. 14-22.	National Sportsmen's Show. Grand Central Palace, New York, N. Y.
Feb. 16-17.	S.P.I. of Canada. Sixth Annual International Plastics Conference. Mount Royal Hotel, Montreal, P. Q., Canada.
Feb. 16-18.	American Management Association Conference and Special Exposition. Palmer House, Chicago, Ill.
Feb. 17.	Rochester Section, S.P.E.
Feb. 18.	Philadelphia Section, S.P.E. Franklin Institute, Philadelphia, Pa.
Feb. 20.	Southern Ohio Rubber Group.
Feb. 20.	Detroit Rubber & Plastics Group.
Feb. 27.	Cleveland Section, S.P.E.
Mar. 1-31.	Red Cross 1948 Fund Appeal.
Mar. 1-6.	A.S.T.M. Committee Week. Washington, D. C.
Mar. 2.	Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Mar. 8-20.	Toy Fair, New York, N. Y.
Mar. 9-10.	Commercial Chemical Development Assn. Annual Meeting. Hotel Roosevelt, New York, N. Y.
Mar. 10.	Newark Section, S.P.E.
Mar. 10.	Rhode Island and Southeastern Massachusetts Section, S.P.E.
Mar. 11.	Quebec Rubber & Plastics Group. Ritz Carlton Hotel, Montreal, P. Q., Canada.
Mar. 16.	Rochester Section, S.P.E.
Mar. 19.	Boston Rubber Group. Spring Meeting. Somerset Hotel, Boston, Mass.
Mar. 26.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Mar. 28-31.	West Coast Section. S.P.I. Annual Conference and Exhibit. Hotel Biltmore, Santa Barbara, Calif.
Apr. 3-10.	National Baseball Week.
Apr. 6.	Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Apr. 8.	Quebec Rubber & Plastics Group. Ritz Carlton Hotel, Montreal, P. Q., Canada.
Apr. 14.	Newark Section, S.P.E.
Apr. 14.	Rhode Island & Southeastern Massachusetts Section, S.P.E.
Apr. 16.	Akron Rubber Group.
Apr. 19-23.	American Chemical Society. Spring Meeting. Chicago, Ill.
Apr. 20.	Rochester Section, S.P.E.

RUBBER WORLD

NEWS of the MONTH

Highlights—

The record of the hearings before the House Armed Services subcommittee on rubber show that not too much progress has been made in reconciling different views both in industry and government on the major controversial issues of rubber legislation. Much hitherto unpublished information on synthetic rubber costs, the status of the various plants in the government program, and a new process for producing alcohol for butadiene, also came to light. Additional year-end statements of rubber industry executives continued optimistic in outlook for business conditions during 1948. The URWA indicated that it would make a formal request for wage increases during February.

Congressional Hearings Fail to Settle Rubber Policy; Industry Outlook Continues Good

The more than 400 pages of record of the hearings before the House Armed Services subcommittee on rubber, which became available during January, supply more confirmation that the widely different views on controversial issues of rubber policy will not be reconciled in any legislation Congress may pass. In addition, this difference in views is evident in the subcommittee itself, and no bill representing the majority opinion of the subcommittee itself seems likely. Representative Shafer, chairman of the subcommittee, introduced his own bill on January 19, and Representative Crawford, another prominent member of the subcommittee, gave indication that he might have a separate bill of his own or suggest many amendments to the Shafer bill. This procedure, however, seemed to have the approval of the subcommittee as the best means to try and arrive at a solution for this difficult problem, i.e., settle the controversial issues on the floor of the two Houses of Congress in full discussion by all members.

Previously unpublished information on the cost of producing synthetic rubber and the present classification of government plants into those active, standby, and declared surplus, together with depreciation and investment value as of September 30, 1947, was found in the record of the subcommittee hearings.

Further year-end statements by industry executives, not available last month, show continuing optimism for a prosperous year for the rubber goods industry in 1948.

Shafer Committee Hearings

During January the complete record of the hearings of the subcommittee on synthetic rubber of the House Armed Services Committee became available, and parts of the testimony and certain interesting data in the form of tables, not previously reported in India RUBBER WORLD, may now be recorded.

In the testimony at Houston, Tex., on November 8, 1947, George P. Bunn, vice president, Phillips Petroleum Co., took a position in favor of disposal of the synthetic rubber plants to private industry. With reference to the proposed new legislation, he said:

"If, at least, 250,000 tons of butadiene-styrene-type rubber can be assured at the outset by law, all of the seven basic butadiene plants and the corresponding capacity of copolymer plants could be operated by private interests within reasonable economic limits, and the rubber right now could be made at prices no higher than present GR-S price of 18½¢ a pound, all reasonable profits included with assurance that at least this much synthetic rubber must be used, without stipulation of kind —and this is important—so that research and progress won't be handicapped, we believe all the present seven basic butadiene plants, with a corresponding capacity of copolymer plants, could be transferred to private operations. A satisfactory competitive supply could be maintained with some plants in the hands of other than those of the larger rubber products manufacturers. Thus, the greatest economic good could be obtained from the war rubber plant investments, already assumed, but unpaid for by the American public, and the best measures of national security assured."

Mr. Bunn's remarks regarding standby capacity are also of interest.

"The 600,000 tons of capacity recommended to be kept in standby condition, even with the best of care to be devised, and at even tremendous initial and maintenance expense, cannot be restarted and discontinued at whimsical intervals as a means of indirectly regulating the price of imported natural rubber."

Introduced into the testimony at the hearing in Houston was a letter from the Army and Navy Munitions Board to A. W. Ferguson, director, Humble Oil & Refining Co., at Houston, requesting answers to several questions regarding starting up butadiene and Butyl plants after a five-year shutdown, with special reference to personnel, feedstocks, etc. It was indicated that a period of from three to four months would be required to start the butadiene plants and about four months to start the Butyl plant. It was estimated that for the butadiene plants the average total cost per year for shutting down, maintenance, and start-up would be about 3% of the original investment on a five-year basis and 2% on a ten-year basis. For the Butyl plants the total cost was estimated as about 2.75% on a five-year basis and 1.75% on a ten-year basis. For complete details see page 634.

Firestone Testimony

At the testimony in Washington, D. C., Harvey S. Firestone, Jr., head of Firestone Tire & Rubber Co., recommended that the production of synthetic rubber be turned over to private industry if this policy can be adopted without danger to the national security.

"I favor the maintenance of a substantial synthetic rubber industry in the United States and I favor the continuation of present controls of rubber consumption until our government has had the opportunity to acquire a rubber stockpile of sufficient size to meet the requirements of national security," Mr. Firestone said.

"Our synthetic rubber industry is the best paid-up insurance policy that this country ever had. It is vital to our national security and to our economic independence that we maintain this synthetic rubber industry. In my opinion, this can best be achieved by having manufacture and research returned to private idustry at the earliest practicable time."

U. S. Rubber Statement

George M. Tisdale, vice president, United States Rubber Co., in his statement favored continued government control and operation of the synthetic rubber plants.

"The paramount issue is the accumulation of a suitable national stockpile of natural rubber," Mr. Tisdale said, because:

"1. We cannot now or in the short term future protect our security without a percentage of our rubber needs being assured in natural rubber.

"2. GR-S rubber is not capable, as now known, of replacing natural rubber in full, nor does it permit the making of satisfactory products such as are needed in an emergency or for many civilian uses.

"Since we are all agreed that it is in the national interest to maintain in use or in standby an aggregate actual capacity of 600,000 long tons of GR-S type rubber, my company has considered the possibilities of how to do so while natural rubber is in short supply. We believe piecemeal sale, if possible, to be unsatisfactory because:

"1. The provision of raw materials for copolymers plants sold will be difficult to arrange properly since only the Government owns some of the facilities.

"2. It would complicate the placing of manufacturing orders with no corresponding improvement.

"3. It would break up a single operating organization which is part of our strength in synthetic rubber, pending the accumulation of the natural rubber stockpile.

"We have considered leasing the entire group of plants now in operation to present operators, but can see no gain in national security, because:

"1. So long as mandatory use of GR-S is required to permit accumulation of natural rubber, the government must contract with lessees, for their output and supply the raw materials to maintain the same status for all consumers.

"2. Such leases would be no better than the present operating contracts, but more difficult to handle. No doubt leases would be given up when there are no more mandatory uses.

"3. There would be no corresponding improvement in national security since only the necessary acquisition of natural rubber can bring about such at this time.

"Our conclusion is to follow the report (RMA Report of AXMB) and let things remain as they are now with copolymer plants privately operated for the Government until the shortage of natural rubber has been materially relieved—this seems possible within the next 16 months, as outlined on page 4 of the report.

"The United States Rubber Co. believes termination of the December 19, 1941, technical agreement should be carried out

immediately upon enactment of new legislation if not inconsistent with national security. This offers great benefit to private competitive research and development.

"We concur in the other recommendations in the report on which there is general agreement," this statement concluded.

General Tire Statement

The rather lengthy testimony of Fred A. Mayfield, consultant, appearing for The General Tire & Rubber Co., is very well presented in a booklet entitled "Washington Rubber Hearing," as summarized by Everett G. Holt, United States Department of Commerce, and published by The Rubber Manufacturers Association, Inc., in January. Mr. Holt's summary follows:

"The statement for The General Tire & Rubber Co., presented by Mr. Fred A. Mayfield, Consultant, emphasized their independent position—they own no rubber plantations, are not signatory to the patent pooling agreement on synthetic rubber although obligated to 'exchange of information' under their operators agreement with Rubber Reserve, and have conducted extensive research at their own expense, while operating the copolymer plant at Baytown, Tex. Their developmnt of Black Masterbach GR-S is alleged to exemplify that pool effort is not necessary for accomplishment in the field of development.

"They urged that the Government get out of the rubber industry just as quickly as considerations of national security will permit, believing free competitive enterprise will push the synthetic rubber industry forward far more effectively.

"They recommended that private industry be granted the privilege of buying or leasing facilities plant by plant ('peel-off' basis), with price protection and volume protection on raw materials to operators while there are both government-operated and privately-operated plants; they believe private operators could meet even reduced government selling prices for GR-S. Some government control over minimum volume production of GR-S might be necessary in case of excessive overall demand.

"Since obsolescence of plant equipment is likely to be rapid, a thoroughly deflated realistic view of valuations should be taken and the government should be prepared to write off as war costs a large portion of its original investment to arouse interest of buyers or lessees.

"Terms of sale should provide for a substantial cash payment and decreasing annual payments for a term of years, perhaps 10, with the purchaser able to forfeit his investment and return the plant to the government if he desires, without recourse to his other property ('walk-away' privilege). The government should reserve the right to cancel all commitments to buyers or lessees if sufficient plants are not disposed of within 12 months to maintain production at the rate determined as desirable, which was suggested as 300,000 tons. It was believed, however, that private industry would acquire sufficient plants, and that there would be few walk-aways.

"The power of dictating compulsory use of synthetic rubber is the only function believed necessary for the government over a period of years. If natural rubber prices were lower than for GR-S for an extended period, and plants were returned to the government, it should have power to restore compulsory use to assure maintenance of demand at a proper amount.

"While advocating that practically all manufacturers of rubber goods should be required to use a percentage of chemical rubber, they should not be told *where* to use it, except that every passenger tire should be required to contain some synthetic rubber. No need was seen for forcing use of specified quantities into tires and related products, even though they constitute the largest use for rubber. Fears that without forced use in tires, development of the use in that field would lag, are felt only by those not fully aware of what is in the minds of private industry.

"Efficient private operators will not only lower costs of production but will produce improved rubbers. The market price of GR-S would be below the present government price. A lowering of the present 18½¢ selling price was urged on grounds that it was profitable to the government, and that losses on war production of butadiene from alcohol should be charged off as war costs and not recovered in current profits. Maintenance costs of standby plants should be charged to national security costs borne by taxpayers generally.

"Costly government-financed research, and patent pool operations, should both be ended. Secrets on research will not come to light while the patent pool is operative. Even under continued government ownership and operation all patent pool arrangements should be discontinued.

"Mr. Mayfield's statement contained more definite and frank suggestions regarding terms prospective buyers of plants regard as desirable than that of any other witness. He was questioned critically by Mr. Johnson who thought the 'peel-off, write-off, and walk-away' provisions, with protected prices for raw materials and a guaranteed market for the product under mandatory use, would not test the abilities of private enterprise, even at the 15½¢ market price for GR-S suggested in the statement."

Testimony by Allen T. Grant

Allen T. Grant, president, Charles T. Wilson Co., importer of natural rubber, made the following statement before the subcommittee:

"The very nature of my business indicates that I personally benefit, naturally, from the greatest use of natural rubber. I would like to stress, however, that I am a firm believer in the preservation of a sound and strong synthetic industry . . . I, for one, had hoped that Public Law 24 could be followed by permanent rubber legislation, since the sooner such legislation can be enacted the sooner will we all know the rules of the game. The sooner also will the natural rubber producer be able to obtain an accurate picture of the future of rubber; that is, natural and synthetic.

"However, in the light of the testimony that has been given before your committee, I readily admit that a very strong, if not unanswerable, case has been made for further delay. I desire, therefore, to associate myself with the proposal that Public Law 24, be extended for a period of one year, until March 31, 1949. It is my belief, and hope, that by that date permanent rubber legislation should be practicable.

"In recommending this step, I should like to express the hope that the implementation of that law be made more flexible and that the compulsory use of synthetics be limited strictly to the needs of national security . . .

"Such compulsory use should be kept to an absolute minimum consistent with the preservation of that industry. If this is done, firstly, industry will have the maximum in freedom of choice of the materials it can use; secondly, consumers will receive the best possible end product at the lowest possible cost; thirdly, in the event of an emergency we shall have a stockpile of finished goods—tires, in particular—of the highest possible quality, which will last much longer.

"We are, I think, sometimes inclined to lose sight of the very important part that such a concealed stockpile played during the last war. And, finally, literally millions of people in the Far East whose very livelihood depends upon natural rubber, will find that livelihood affected to the smallest possible extent. We are in process of lending or giving money to a number of foreign countries with a view to restoring economic conditions that we hope will lead to a peaceful world. Natural rubber stands high in international trade, and the fewer the restrictions we place on its use the more settled, and therefore peaceful, will be those countries which produce it.

"This policy is surely one of national security in its broadest sense. A policy which is protecting the synthetic rubber industry at home does all it can to bring peaceful conditions abroad. Protect the synthetic industry, by all means, until it can stand on its own feet, but minimize that protection so that its effect on world trade in general, and in the Far East in particular, will be no greater than our own national security demands."

National Agrol Co. Process

A letter addressed to Chairman Shafer from the National Agrol Co., signed by William J. Hale, president, gave comparative data on a process for the production of ethyl alcohol by a new method which indicated a cost of 26¢ a gallon as compared with 71¢ a gallon by other present-day methods. The raw material was corn at an assumed price of $1.50 a bushel. A table of cost data follows:

COMPARATIVE COSTS OF INDUSTRIAL GRAIN ALCOHOL BY PRESENT-DAY (OR ORTHODOX) PROCEDURE AND BY NATIONAL AGROL PROCEDURE

Charges at Present-Day Levels

	Orthodox	Agrol
56 lbs. of grain (12% mixture, bushel) taken at	$1.50	$1.50
6 lbs. of malt	.48	...
Manufacture of 2 lbs. of mold bran from grain bran	...	.03
Steam, power, and water	.17	.10
Labor and supervision	.15	.08
Capital and maintenance	.10	.06
Insurance, bonds and taxes	.08	.05
Total charges	$2.48	$1.82
By-product credits:		
18 lbs. dried residuals at 2½¢	.45	.45
0.5-lb. corn oil at 30¢ (old procedure)	.15	...
2 lbs. corn oil at 30¢. (extraction procedure)	...	.60
Total by-product credits	$ .60	$1.05
Net alcohol cost:		
Charges less by-product credits	1.88	.77
Alcohol yield, gals. at 190 proof (theory—3.25 gals.)	2.65	3.00
Cost of one gal. of alcohol	.71	.25

These laboratory results are only typical of the general and extended improvements yet to come, it was said. There is no question but that ethyl alcohol, 190 proof, can be produced at less than 15¢ a gallon when starting with grain at approximately $1 a bushel, or when starting with other carbohydrates that can be grown for this price in case the staple grains do not return to normal.

Thus from fermentation alcohol, we can confidently look toward a cost of purest ethylene made therefrom at less than 3¢ a pound. From this priced ethylene combined with ethyl alcohol, butadiene can be produced at about 8¢ a pound, a price not out of line with its cost when prepared by direct dehydrogenation of butane, of petroleum source, it was said.

Further Hadlock Testimony

G. B. Hadlock, Office of Rubber Reserve, in a later appearance before the

subcommittee than that reported last month provided a revised tabulation (Table 1) showing the cost of synthetic rubber produced and sold from May, 1942, to September 30, 1947.

Mr. Hadlock also submitted a table showing the original plant investment, amount of depreciation, and net plant investment, as of September 30, 1947, of all plants in the synthetic rubber program. These figures were classified for plants in active, standby, and surplus status and are recorded in Tables 2 and 3.

6 PtP. Table To Come— —

OMD Statistical Study

The record of the Shafer subcommittee hearings contains the results of a statistical study entitled "The Relative Adequacy of Alternative Programs of Synthetic Usage." This rather lengthy report explains that the study was designed to measure the overall adequacy of our rubber assets under various alternative assumptions concerning the long-range synthetic program and at various points of time in the future. Forward balance sheets were prepared on the basis of four alternative programs of synthetic usage: (1) GR-S consumption at 33 1/3% of GR-S plus natural; and Butyl at 4% of total new rubber. (2) GR-S consumption at 25% of GR-S plus natural; and Butyl at 4% of total new rubber. (3) GR-S consumption at 17½% of GR-S plus natural. (4) Complete abandonment of government controls.

The complete tables of data will not be repeated here, but some of the conclusions reached were summarized as follows:

(1) Under no assumed program of future GR-S usage will we be prepared against a five-year emergency that breaks before 1949.

(2) If an emergency is deferred until 1950, or such time as our strategic stocks of natural rubber are built up to the presently established objective, a balance can be achieved under any of the three assumed levels of continued synthetic usage, provided that the standby capacity of GR-S and other synthetic rubbers are always ready for reactivation.

(3) The twin facts noted above suggest the adoption of a program that would speed the accumulation of our strategic stockpile and hence shorten the period of vulnerability.

(4) Continued use of GR-S during 1948 and longer is not a matter of choice, but of necessity.

(5) Continuation of program 1 (33 1/3% GR-S) through 1948 would require a total of 328,000 long tons of synthetic rubber; program 2, the 25% GR-S level, would require 289,000 long tons, or little more than would be dictated by the shortfall of natural rubber.

(6) Legislation providing for some level of a going synthetic industry after March 31, 1948, is basic to our security program.

(7) Since both production and consumption of GR-S and Butyl are dictated by the supply-demand situation, the immediate question is one of mandatory controls *versus* unregulated competition for scarce rubber supplies.

(8) The statistical findings prove the need of a going synthetic industry for at least the next two years and the continuing necessity of standby facilities.

(9) Proposals for a larger strategic stockpile as a substitute for a going synthetic industry are unrealistic, since a going synthetic industry is necessary to achieve even the present goal; and once that goal is achieved, standby capacity capable of reactivation within a year offers adequate protection.

(10) The United States should import its total calculated availability of natural rubber regardless of the type of long-range synthetic program approved by Congress.

Interesting information was also introduced which had resulted from a questionnaire circulated among 1,000 manufacturers of rubber products. The questionnaire asked what percentage of total new rubber consumption would be GR-S

TABLE 1. COST OF SYNTHETIC RUBBER PRODUCED AND SOLD FROM MAY, 1924, TO SEPTEMBER 30, 1947

	May, 1942, to August 31, 1945	Sept. 1, 1945, to Sept. 30, 1947	Total
Cost of materials	$801,863,000	$383,889,000	$1,185,752,006
Labor, maintenance, and other operating costs, including management fees and royalties	128,474,000	127,627,000	256,101,000
Cost of rubber sold	930,337,000	511,516,000	1,441,853,080
Sales revenue	885,593,000	621,282,000	1,506,875,000
Gross operating profit or (loss)	(44,744,000)	109,766,000	65,022,000
Depreciation expense on operating plants	115,284,000	105,066,000	220,350,000
Research and development	8,429,000	7,740,000	16,169,000
Net operating loss	168,457,000	3,040,000	161,497,000
Non-operating charges:			
Standby expenses	47,000	5,670,000	5,717,000
Depreciation on standby plants	.....	14,424,000	14,424,000
Miscellaneous expenses	(1,209,000)	2,337,000	1,128,000
	(1,162,000)	22,431,000	21,269,000
Loss on surplus property transferred to disposal agents	.....	89,208,000	89,206,000
Net loss before administrative and interest charges	167,295,000	114,677,000	281,972,000
Administrative expenses	6,533,000	5,722,000	12,255,000
Interest expense	8,827,000	8,732,000	17,559,000
Total net loss	182,655,000	129,131,000	311,785,000

TABLE 2. SCHEDULE OF PLANT INVESTMENT COSTS AS OF SEPTEMBER 30, 1947

Plancor No.	SR No.	Active Projects Company and Location	Plant Investment	Reserve for Depreciation	Net Plant Investment
		Butadiene Plants			
706	37	Cities Service Refining Co., Lake Charles, La.	$ 17,218,867.66	$ 5,393,250.97	$ 11,825,616.69
485	10	Humble Oil & Refining Co., Baytown, Tex.	18,158,658.12	7,039,406.85	11,119,251.27
933	22	Neches Butane Products Co., Port Neches, Tex.	55,261,870.77	20,455,386.15	34,806,484.62
1063	24	Sinclair Rubber, Inc., Houston, Tex.	30,772,654.50	9,587,232.58	21,185,421.92
484	12	Phillips Petroleum Co., Borger, Tex.	37,934,098.40	13,743,214.58	24,190,883.82
1593	83	Standard Oil Co. of California, Elgundo, Calif.	8,140,662.58	2,875,075.53	5,265,587.05
1355	123	Standard Oil Co. of New Jersey, Baton Rouge, La.	1,993,274.68	874,689.34	1,118,585.34
		Total butadiene plants	$169,480,086.71	$ 59,968,256.00	$109,511,830.71
		Styrene Plants			
929	27	Dow Chemical Co., Torrance, Calif.	$ 13,527,040.85	$ 5,108,046.08	$ 8,418,994.77
		GR-S Plants			
876	41	Copolymer Corp., Baton Rouge, La.	$ 7,401,996.64	$ 2,312,637.34	$ 5,089,359.30
1056		Firestone Tire & Rubber Co.:			
		Lake Charles, La.	12,319,415.36	3,103,690.00	9,215,725.36
983	157	Port Neches, Tex.	11,403,049.72	3,191,742.34	8,211,307.38
877	40	General Tire & Rubber Co., Baytown, Tex.	8,172,333.55	2,157,751.64	6,014,581.91
982	18	B. F. Goodrich Co.:			
983	39	Borger, Tex.	9,023,296.14	2,479,409.04	6,543,887.10
		Port Neches, Tex.	19,326,170.76	5,142,331.22	14,183,839.54
956	34	Goodyear Synthetic Rubber Co.:			
611	19	Houston, Tex.	13,193,366.45	3,399,651.15	9,793,715.30
		Los Angeles, Calif.	9,938,739.60	2,576,469.48	7,362,270.12
129	4	United States Rubber Co., Naugatuck, Conn.	9,218,318.42	2,507,883.14	6,710,435.28
		Total GR-S Plants	$ 99,996,686.64	$ 26,871,565.35	$ 73,125,121.29
		GR-M Plants			
625	20	E. I. du Pont de Nemours & Co., Inc. Louisville, Ky.	$ 37,724,040.09	$ 14,885,086.63	$ 22,838,953.46
		GR-I Plants			
1082	43	Humble Oil & Refining Co., Baytown, Tex.	$ 25,921,137.44	$ 6,567,668.22	$ 19,353,469.22
210	15	Standard Oil Co. of New Jersey, Baton Rouge, La.	24,821,978.91	9,790,000.21	15,031,978.70
		Total GR-I Plants	$ 50,743,116.35	$ 16,357,668.43	$ 34,385,447.92
		Chemicals and Miscellaneous			
1166	201	National Carbide Corp.:			
1607	58	Ashtabula, O.	$ 3,237,819.51	$ 701,531.84	$ 2,535,287.67
		Louisville, Ky.	849,280.90	194,138.64	†655,142.26
1891	223	University of Akron, Akron, O.	1,652,581.11	468,898.60	‡1,183,682.51
545	...	Tank Cars	2,306,636.95	417,928.08	‡1,888,708.87
		Automotive and miscellaneous	23,918.57	18,927.33	4,991.24
		Total chemicals and miscellaneous	$ 8,070,237.04	$ 1,802,424.49	$ 6,267,812.55
		Total Active Projects	$379,541,207.68	$124,993,046.98	$254,548,160.70

* Calcium carbide. † Acetylene and nitrogen. ‡ Evaluation laboratory.

(Continued on next page)

TABLE 2 (Continued)

		Stand-By Projects			
1207	55	Carbide & Carbon Chemicals Corp., Louisville, Ky.	$ 32,772,706.32	$ 11,381,399.78	$ 21,391,306.54
483	11	Koppers Co., Inc., Kobuta, Pa.	47,681,571.44	16,842,899.09	30,831,672.35
963	21	Shell Union Oil Corp., Torrance, Calif.	19,922,528.47	7,027,234.37	12,795,294.10
152	29	Standard Oil Co. of New Jersey, Baton Rouge, La.	9,391,654.98	3,530,848.49	5,860,806.49
638	351	Great Southern Corp., Corpus Christi, Tex.	8,197,995.07	2,574,487.00	5,623,508.07
592	321	Premier Oil Co., Longview, Tex.	6,663,767.26	2,217,201.36	4,446,565.90
		Chicago Corp:			
638B	348	Wardner plant, Bishop, Tex.	851,868.74	276,857.35	575,011.39
638C	348	Coastal plant, Aqua Tules, Tex.	835,784.74	271,630.01	564,154.73
638D	348	Gulf Plains Corp., Driscoll, Tex.	926,651.70	301,161.82	625,489.88
318E	360	L. M. Lockhardt plant, Bouquette, Tex.	422,890.88	137,439.54	285,451.34
167	44	Southern California Gas Co., Los Angeles, Calif.	13,087,142.34	4,290,842.23	8,796,300.11
1526	158	Standard Oil Co. of New Jersey, Baton Rouge, La.	689,569.65	290,127.06	399,442.59
1295	47	Westvaco Chlorine Products Co., Newark, Calif.	1,024,812.59	505,192.80	519,619.79
127	8	Firestone Tire & Rubber Co., Akron, O.	7,350,684.40	2,385,768.73	4,964,915.67
126	9	Goodyear Tire & Rubber Co., Akron, O.	7,892,384.38	2,633,304.96	5,259,079.42
128	6	B. F. Goodrich Co., Louisville, Ky.	59,739.03	4,480.46	55,258.57
1278	56	National Synthetics Corp., Louisville, Ky.	7,249,277.44	2,083,369.94	5,165,907.50
980	32	United States Rubber Co., Institute, W. Va.	17,652,628.06	4,923,279.89	12,729,348.17
611	176	United States Rubber Co., Torrance, Calif.	5,213,310.81	1,295,411.69	3,917,899.12
		Total stand-by projects	$187,779,968.30	$ 62,972,936.57	$124,807,031.73
		Total plant and equipment	$567,321,175.98	$187,965,983.55	$379,355,392.43

TABLE 3. PLANTS DECLARED SURPLUS TO WAR ASSETS ADMINISTRATION

SR No.	Company and Location	Product	Land, Structures and Equipment	Reserve for Depreciation	Net Book Value
6	B. F. Goodrich Co., Louisville, Ky.	GR-S	$ 16,818,230.63	$ 2,975,584.63	$ 7,842,646.00
7	Monsanto Chemical Co., Texas City, Tex.	Styrene	18,812,308.64	5,793,289.83	13,019,018.81
11	Koppers Co., Inc., Kobuta, Pa.	Styrene	12,242,221.55	5,564,210.07	8,678,011.48
30	Dow Chemical Co., Velasco, Tex.	Styrene	17,628,017.21	5,391,507.17	12,236,510.04
48	Dow Chemical Co., Velasco, Tex.	"Thiokol"	2,270,242.97	.....	2,270,242.97
59	Q. O. Chemical Co., Memphis, Tenn.	Furfural	4,355,982.03	1,067,111.00	3,288,871.03
75	Davison Chemical Co., Baltimore, Md.	Silica gel	2,054,404.95	672,645.26	1,381,759.69
86	Eastern States Petroleum Co., Houston, Tex.	Crude Butadiene	3,774,180.51	.....	3,744,180.51
60	Filtros, Inc., East Rochester, N.Y.	Catalyst carrier	174,729.69	57,195.54	117,534.15
91	E. I. du Pont de Nemours & Co., Inc., Newark, N. J.	Silica gel	1,291,886.94	441,601.04	850,285.30
88	Sun Oil Co., Toledo, O.	Butadiene	7,566,539.26	4,253,789.40	3,312,749.86
1, 5	Carbide & Carbon Chemical Corp., Institute, W. Va.*	Butadiene-Styrene	47,107,433.08	17,548,095.38	29,559,337.70
	Miscellaneous property declared surplus		3,575,802.36	701,534.00	2,874,286.36
	Total		$131,871,979.82	$ 42,666,563.92	$ 89,206,415.90

*Two plants.

if the manufacturer could buy it for: (1) the same price as natural rubber; (2) 2¢ under the price of natural rubber; (3) 4¢ under natural rubber; (4) 6¢ under natural rubber. It was also asked how the consumption of reclaimed rubber would be affected under each of these four conditions.

The replies, which amounted to about one-third of the manufacturers questioned and represented about 82% of the total consumption of natural and GR-S and 74% of the reclaimed rubber consumed during the third quarter of 1947, indicated that if GR-S sold at the same price as natural rubber, approximately 5.6% of the rubber used would be GR-S. At 2¢ under natural, the GR-S consumption would be approximately 16.6%; at 4¢ under natural, 31.2%, and at 6¢ under natural, 35%.

The replies on how the consumption of reclaimed rubber would be affected were reported as not, in general, sufficiently intelligible to arrive at any very definite conclusions. It appears, however, that the greater proportion of reclaimed rubber consumption would not be materially changed by the use of large quantities of GR-S, possibly decreasing 5% under condition 1, 10% under condition 2, 20% under condition 3, and 33 1/3% under condition 4.

The Shafer Bill

Rep. Paul W. Shafer introduced a bill (H.R. 5107) in the House on January 19, which he explained was intended as "permanent legislation." The bill was proposed without prior consultation with other members of the House Armed Services subcommittee, of which he is chairman. This action by Representative Shafer probably results from the fact that the subcommittee members hold varying views on a desirable rubber program. Other bills may also be submitted, and the final decision on the more controversial issues, which are not included in the Shafer bill, will have to be made on the floor of the House.

The Shafer bill requires tonnages of 600,000 for GR-S and 75,000 special-purpose rubbers to be maintained continuously either in active operation or standby. It requires a minimum production of 200,000 long tons of GR-S and 25,000 long tons of special-purpose rubbers such as Butyl and neoprene. The bill gives the President authority to determine which plants should be operated and which put in standby and requires that he maintain at least one alcohol-butadiene plant in either standby or active operation. A single agency to administer the rubber program is to be designated by the President, but that agency must submit all plant disposal plans to Congress where they must be approved by concurrent resolution of both Houses. Congressional appropriations for government research and development are to be made, and the President is given authority to designate the agencies to conduct this work.

The Shafer bill does not include decisions on the patent pool agreement or the pricing of synthetic rubber. It merely states that "whenever possible the sale or lease of any facility shall be made so as to encourage the development of new, independent enterprises."

Further Industry Outlook Statements

Year-end statements of certain industry leaders, not available for our January issue, have since been received and may now be reported.

Harvey S. Firestone, Jr., now chairman of the board, Firestone Tire & Rubber Co., pointed out that Americans once more proved in 1947 their unsurpassed ability to produce efficiently on an increasing scale. The national net income reached a peacetime peak of more than 200 billion dollars for the year, representing an increase of about 15% over the 1946 total of 178 billion dollars. Civilian employment rose to a new postwar high of 58,595,000, and industrial production averaged 9.5% above the rate for 1946.

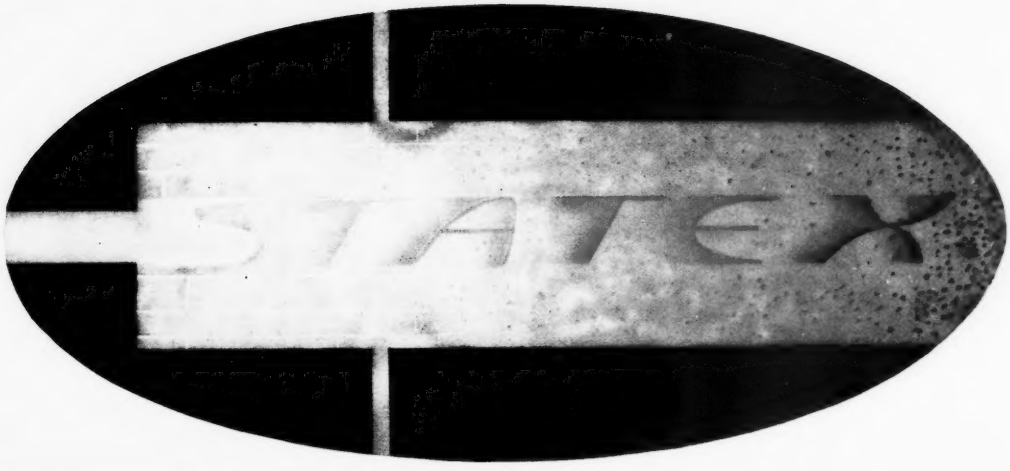
More commercial vehicles moved a greater volume of goods and food over the highways than ever before, and as the automobile industry shifted into high gear, the number of passenger cars on the road mounted to 28,200,000, and motorists traveled greater distances, Mr. Firestone said. Farmers received more and more tractors and mechanized implements and put their equipment to increasing use.

These developments, coupled with the remaining backlog of demand for tires of all kinds, resulted in a record performance by the rubber industry. During 1947 a total of 95,700,000 highway and farm tires was shipped, as compared with the previous high level of 87,000,000 established in 1946.

But despite this record output, which has all but eliminated shortage conditions in the consumer market, our industry still faces huge demands. Replacement needs and manufacturers' requirements in 1948 will maintain production at rates far exceeding those of prewar years. In addition, the pipelines of distribution have not yet been completely filled. The inventories of both dealers and manufacturers are still to be restored to normal, and several million tires are needed for this purpose alone.

The achievements of the rubber industry in 1947 can be credited largely to continuous production, expanded capacity, and advanced production techniques born of years of research and development. Besides, while prices of other goods rose substantially, tire prices were cut back from wartime levels, and the quality of tires was improved, Mr. Firestone said. Surely, here can be found proof of the strength of our system of competitive free enterprise, he added.

W. O'Neil, president, General Tire & Rubber Co., called attention to the fact that few persons realize that the rubber industry, in its constant search for a better product, has become a tremendous factor in the field of chemistry. Because of the new horizons in chemistry, the frontiers are not closed in the rubber business. The future is certain to bring a markedly better synthetic rubber and even a finer natural rubber. In this tremendous re-



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MPC (Medium Processing Channel)
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◆

EPC (Easy Processing Channel)
MICRONEX W-6

◆

HMF (High Modulus Furnace)
STATEX-93

◆

FF (Fine Furnace)
STATEX-B

◆

VFF (Very Fine Furnace)
STATEX-K

◆

FEF (Fast Extruding Furnace)
STATEX-M

◆

SRF (Semi-Reinforcing Furnace)
FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

search now going on in the rubber industry, there is no limit to what the future may bring and the new business it ... create, he added.

It is essential that we create new business—and it is essential that we work hard in 1948. Despite thinking to the contrary, we must work ourselves out of the high price spiral. Production is the answer to high prices; nothing else can solve the problem.

The modern car, with its speed, requires a better non-skid tire and better balance in both wheels and tire, and 1948 will see a shift industry-wide to a lower pressure, larger-size tire to meet this problem. More cars and more power in these cars make the necessity of a better non-skid tire more urgent than ever before—and here again the rubber industry's research is pointed to meet this requirement.

This required shift in automobile tires plus the fact that this is the first time in history that the industry has a winter-time backlog of orders indicates a year of good business in 1948. Part of this condition is due to the wartime shortage of tires. The increasing use of tires on highway trucks for hauling freight and also on farm implements very probably is the answer for the extra good business in 1947 and is the reason for the enthusiastic outlook for 1948, Mr. O'Neil concluded.

J. P. Seiberling, president, Seiberling Rubber Co., stated that the year ahead should provide some interesting readjustments in various phases of business and industry and distribution. He believes the inflation spiral is nearing the end of its course, because production is beginning to improve steadily in most commodities. The break in prices will almost certainly occur before the end of the year, although probably not before early fall.

For the rubber industry, he cannot foresee any great loss of employment or prosperity. Production of new cars, which should increase steadily through 1948, will call for a great many new tires. Sales of replacement tires should be off slightly, but general volume will continue to be high, although not quite at the level of the past two years.

He predicts that the tire distribution picture will continue to change for the better for independent tire dealers, who have seen their share of the replacement tire market grow appreciably since the beginning of the war. Independent dealers as a group are now leading the replacement market, and he believes they will hold their gains, Mr. Seiberling said.

RMA and OMD Reports

The regular monthly report of the Rubber Manufacturers Association on tire and tube production and shipments showed that by November 30, 1947, the industry had produced 71,168,058 passenger-car tires and 16,330,552 truck and bus tires, as compared with 60,371,664 and 14,415,357, respectively, for the same period in 1946.

Shipments of passenger-car tires in November were 6,413,354, down 8.56% from October, but 11 months' shipments in 1947 were 68,780,518, compared with 59,823,400 in the like period in 1946. Truck and bus tire shipments in November totaled 1,501,991 units, down 7.55% from October, but total shipments for 11 months amounted to 15,831,111, as against 14,351,558 in the same period last year.

Manufacturers' inventories of passenger-car tires on November 30 were down 2.87% to 3,990,905; while truck and bus tire inventories were reduced about 10% to 1,265,373 units. The full report will be found on page 678.

The report of the Office of Materials Distribution, Department of Commerce, on consumption, distribution, and stocks of rubber showed consumption of rubber according to type in October and November (preliminary figures) as: natural, 57,286 long tons (including 1,818 tons dry weight of latex) and 52,014 (including 1,760 tons dry weight of latex, respectively; GR-S, 36,190 and 30,635 long tons; neoprene, 3,056 and 2,907; Butyl, 6,001 and 5,147; and nitrile types, 421 and 368 tons, respectively.

New supply and production for the same periods were: natural, 49,340 long tons (including 3,085 tons dry weight of latex) and 50,840 long tons (including 1,994 tons dry weight of latex), respectively; GR-S, 27,624 and 29,669 tons; neoprene, 2,325 and 2,519; Butyl, 3,266 and 5,194; and nitrile types, 419 and 443 tons, respectively.

Stocks on hand at the end of these periods were: natural, 114,115 (including 4,561 tons dry weight of latex) and 110,824 (including 5,184 tons dry weight of latex), respectively; GR-S, 44,848 and 46,324 long tons; neoprene, 5,276 and 5,167; Butyl, 13,731 and 12,942; and nitrile types, 3,524 and 3,425 tons, respectively.

Collyer on ERP

John L. Collyer, president of The B. F. Goodrich Co., in a letter to Senator Arthur H. Vandenberg, chairman of the Senate Foreign Relations Committee, has suggested that "the most careful study, with the best possible advice" be made to determine whether constructive changes in the European Recovery Program, as submitted, would not be to increase goals set for food production in the European countries and their dependencies and at the same time reduce "substantially the goals set for industrial expansion in Great Britain and certain other of the 16 European countries."

Mr. Collyer was a member of the President's Committee on Foreign Aid which recently drafted the so-called Harriman report on this country's ability to meet a program envisaged in the Marshall Plan. The report was one of several drawn upon by President Truman and his advisers in drawing up the ERP proposal now before Congress.

"Grave doubt" was expressed by Mr. Collyer over two major premises of the report made to the United States by the 16 nations that the United States and other countries would be able to supply the stated food requirements without dangerous impact on the economies of the supplying countries, while the proposed industrial expansion is going on; and "that these European nations can accomplish their longer-range food and raw materials import goals through the means of industrial expansion and the exports of the resulting manufactured goods.

"The premise that Great Britain and others of these nations can complete in four years, or even six or eight years, the goals they have set for expansion of manufacturing facilities, and for the sale of these goods in world markets, in competition with other countries, and in quantities sufficient to balance with their desired imports, also requires the most searching inquiry," Mr. Collyer added.

He suggested that "American industrialists who possess current knowledge of the industrial economies of Great Britain and other western European nations be invited to express judgments regarding the industrial expansion goals set for those countries."

He said that he did not believe there was any certainty that economic aid grants "by our country will prevent any nation from adopting a Communist or other dictatorship program, and that complete absence of American aid would force any nation to Communism or to another form of dictatorship."

He did say, however, that he did believe that "reasonable American aid administered in a business-like manner can help to relieve the most urgent economic pressures on western Europe and bring fresh hope to free peoples who are endeavoring to get further along the road to economic recovery."

Columbian Carbon Buys WAA Plant

A government owned carbon black plant in Seagraves, Tex., built to produce channel black for the wartime rubber program, has been sold to the Columbian Carbon Co., for $1,420,000, War Assets Administration announced on January 6.

The plant, which had been under lease to Columbian Carbon, is one of the most completely equipped of the carbon black projects fostered by the government. It cost $2,226,179 and has an appraised fair value of $1,779,679, WAA said.

Industrial Relations News

The United States Department of Labor, Wage and Hour and Public Contracts Division, in an announcement early in January stated that violations of the minimum wage, overtime, and child-labor provisions of the Fair Labor Standards Act and the Public Contracts Act were found in 69% of the 257 inspections made in the rubber products manufacturing industry. The United Rubber Workers, CIO, officials have reported that demands for wage increases will be made to the rubber industry during February.

Labor Department Report

The report on violations of the minimum wage, overtime, etc. provisions by rubber goods manufacturers was a part of the 1947 annual report submitted to Congress by W. R. McComb, Administrator of the Wage and Hour and Public Contracts Divisions, U. S. Department of Labor. For the year ending June 30, 1947, inspections in the rubber goods manufacturing industry resulted in back wages amounting to $97,207 agreed or ordered to be paid 2,478 employes. While most violations revealed had resulted from improper computation of overtime pay, it was found also that there were employers who had failed to pay some of their employes the 40¢ an hour minimum wage required under the Fair Labor Standards Act.

Mr. McComb pointed out that the violations disclosed are not necessarily representative of the rubber products industry's compliance record as a whole, since the Divisions make inspections "where there is a high degree of probability that violations will be found."

URW Wage Demand

After a meeting of the international policy committee of the URWA, scheduled for Cleveland, O., on February 7 and 8, wage increase demands will be made on the rubber industry, it was announced late in January. The research department of the union has made an extensive study of wages, cost of living and economics, which will be used to plan the union's wage program for 1948, it was said.

The policy committee will decide whether to set a definite amount or ask the com-

panies for a "substantial" raise and also whether to negotiate the wage demands on a Big Four, company-wide, or individual plant basis. Negotiations on wages with Goodyear Tire & Rubber Co., The B. F. Goodrich Co., and United States Rubber Co., can be opened on a company-wide scale after a 60-day notice has been given, under terms of present contracts. Negotiations with the Firestone Tire & Rubber Co. will have to be on an individual plant basis.

Bureau of Standards Changes

Philip L. Wormeley, assistant chief of the Division of Organic and Fibrous Materials, and chief of the Section on Testing and Specifications of the National Bureau of Standards, retired on December 31, 1947, after 37 years of service with the Bureau and 44 with the federal government. Mr. Wormeley, who is best known for his research on tires, has contributed extensively to the fields of leather, rubber, and the development of federal specifications, and is the author of numerous papers and technical publications. Born in Richmond, Va., in 1878, Mr. Wormeley graduated from the University of Virginia in 1901 with degrees in mechanical and electrical engineering. Before coming to Washington he was with the New Amsterdam Gas Co. and was professor of engineering, applied mathematics, and mechanical drawing at the College of Charleston, S. C. After working as assistant engineer in the Bureau of Chemistry of the Department of Agriculture from 1904 to 1910, Mr. Wormeley became associated with the Bureau of Standards first as technologist, then as chief of the Rubber and Leather Section, then chief of the Rubber Section, and finally in his pre-retirement position.

Gordon M. Kline, chief of the Organic Plastics Section, has been appointed assistant chief of the Division of Organic and Fibrous Materials, it was announced by E. U. Condon, director of the Bureau. Nationally known for his research in such fields as the oxidation of sugar, airplane dopes, polymerization of olefins, and organic plastics, Dr. Kline received his doctorate degree in 1934 from the University of Maryland. After doing chemical work with the New York State Department of Health and the Picatinny Arsenal, Dr. Kline joined the Bureau's staff in 1929 and became chief of the Organic Plastics Section in 1935. He will continue as chief of that section in addition to his new responsibilities.

Robert D. Stiehler has been made chief of the Testing and Specification Section of the Division of Organic and Fibrous Materials. Well known for his research on rubber, Dr. Stiehler was instrumental in developing methods of quality control for synthetic rubber production in government plants during the war. Formerly with the Office of Rubber Reserve, Dr. Stiehler has been with the Bureau of Standards since 1946. After receiving his Ph.D. from Johns Hopkins University in 1933, he worked at Johns Hopkins and the California Institute of Technology until 1938, when he joined The B. F. Goodrich Co. as senior research chemist. He left in 1942 to become technical director of the Climatic Research Laboratory, Quartermaster Corps., and in 1943 came to Washington in charge of product testing and quality control at ORR.

The retirement of W. L. Holt because of ill health was also announced. Mr. Holt, who worked under Mr. Wormeley, is known for his research on tires, including tests of endurance, design factors, durability, power losses, and other characteristics. A graduate in mechanical engineering from the University of Michigan in 1913, Mr. Holt was methods engineer for Western Electric Co. in Chicago for five years. He then spent two years with Goodrich as manager of the experimental department building and testing tires. Mr. Holt joined the Bureau of Standards on April 25, 1921, and became associate engineer in 1922.

War Assets Administration, Washington, D. C., in its recent listings of surplus materials for sale included: adhesive, friction, rubber, and masking tape, pyrometers, gages, valves, wire and cable, chemicals, plastics, and rubber life rafts.

Herron Bros. & Meyer, supplier of pigments to the rubber and other industries, 82 Beaver St., New York 5, N. Y., recently was reorganized and incorporated under the name of Herron Bros. & Meyer, Inc. W. A. Herron, former chief in the New York office, has been elected president; while John W. Herron, previously head of the company, remains as a director. Besides the Herron brothers, directors of the new corporation are Owen J. Brown, Jr., vice president and general sales manager of Godfrey L. Cabot, Inc., Boston, Mass.; F. C. Fernald, Cabot general counsel; and B. A. Wilkes.

Toy Manufacturers of the U. S. A., Inc., recently held its annual meeting in New York, N. Y., at which K. P. Fallon, of A. C. Gilbert Co., New Haven, Conn., was elected president. Among other officers named were: David M. Sellen, Auburn Rubber Co., Auburn, Ind., a vice president; and Ben F. Michtom, Ideal Novelty & Toy Co., New York, assistant secretary. The annual toy fair under the sponsorship of the association will be held in New York, March 8-20.

MIDWEST

Sheller Acquires Dryden

M. M. Burgess, president of Sheller Mfg. Corp., Portland, Ind., recently announced the acquisition by his company, through Shields & Co., of all the outstanding capital stock of Dryden Rubber Co., Chicago, Ill., for a consideration consisting of $4,0.0,000 in cash and $1,700,000 of newly authorized 5% preferred stock.

Dryden Rubber, organized in Chicago in 1901 by George B. Dryden, manufactures a wide line of rubber products, including virtually all of an estimated 135 different rubber items used in an automobile, except tires, inner tubes, radiator hose, and floor mats. Sheller's principal product is steering wheels for motor cars, trucks, tractors, etc. Other products include die castings, chrome plating, radiator shutters, cork gaskets, crown caps, and miscellaneous rubber and cork products.

Sheller increased its long-term indebtedness $2,500,000 to assist in financing the acquisition of Dryden and paid $1,000,000 of the cash portion of the purchase price out of funds on hand. In connection with the transaction, Sheller also issued 65,700 additional shares of common stock, placed privately with investors by Shields & Co.

In a communication sent to Sheller stockholders, Mr. Burgess states, "The combined earnings of Sheller and Dryden, as obtained from the books of account without audit, for the nine months ended September 30, 1947, after present interest charges and taxes, were approximately $1,850,000, which is equivalent to $3.64 a share on the 490,840 shares of common stock now outstanding, after allowance for the dividend requirements of the preferred stock.

No changes in official personnel are contemplated, it is reported, except that, with the expansion of the Sheller board of directors to seven members, George B. Dryden has been elected a director and chairman of the executive committee. Oliver Vinnedge, former vice president and general manager of Dryden Rubber, will continue in charge of those operations.

Mr. Burgess termed the acquisition of the Dryden company "the most important step to date in Sheller's progress" and reported that his organization is "enthusiastic about the new possibilities for growth and service which are presented by the expansion and widening of our operations."

Monsanto Advances Several

The appointment of Howard A. Marple as director of the newly created advertising department of Monsanto Chemical Co., St. Louis, Mo., was announced last month by William M. Rand, president. Mr. Marple, with the company since 1937, served as editor of *Monsanto Magazine* for many years. He has been active in industrial publication circles and since 1944 was manager of Monsanto's trade advertising. He is a native of Boston and a graduate of Tufts College. He also studied at Boston University and Carnegie Tech. He holds a B.S. degree in chemistry. He was first employed in 1922 by the Merrimac Chemical Co., Everett, Mass., which later became part of Monsanto. Mr. Marple is one of the founders and a past president of the National Council of Industrial Editors. He is also a member of the American Chemical Society, the St. Louis Advertising Club, and the Industrial Marketing Council of St. Louis. He served during the first world war in the Chemical Warfare Service.

R. Allan Gardner was appointed assistant director of the department. Mr. Gardner, who attended Princeton University, has been with Monsanto since 1943. Formerly he had been employed by St. Louis advertising and printing concerns.

The organic chemicals division sales department at Monsanto transferred four staff members effective January 1. Claiborne L. Barber goes from sales contacts in the St. Louis area to the organic division sales office in Houston, Tex. Howard I. Armstrong also was transferred from St. Louis to the Merrimac Division. Armin L. Klemm replaces Mr. Barber in the St. Louis area, and Mr. Armstrong is succeeded in St. Louis by Rogers W. Malone, Jr.

Mr. Barber, a graduate of Westminster College, came to Monsanto in 1934, where he was employed in the John F. Queeny plant. He was transferred to heavy chemicals sales, organic division, in 1938. Then

from 1942 to 1945 he was shift supervisor at the company-operated defense plant at Marshall, Tex.

Mr. Armstrong, a graduate of Princeton, was employed in 1942 at Monsanto, Ill., as an analytical chemist. Two years later he was transferred to the plant's research department and in 1945 joined the organic engineering research department in St. Louis. He began sales training in the organic division in December, 1945, and was later assigned to pharmaceutical sales.

Mr. Klemm came to Monsanto in 1946 following two years' naval service. He is a graduate of the University of Missouri. Mr. Malone, a graduate of Georgia Tech, entered the organic division's sales training program in 1946. Both men are chemical engineers.

The appointment of Erwin G. Somogyi to the newly created position of assistant director of research of Monsanto's plastics division, Springfield, Mass., in charge of process development, was announced January 9 by Felix N. Williams, vice president and general manager. Mr. Somogyi, who now reports to the plastics division's director of research, Nicholas T. Samaras, will be in charge of pilot-plant operation, small product manufacture, mechanical development, and research engineering. He has been with Monsanto since 1935. For the past year he has been in charge of three plant investigation groups and the analytical laboratory at the company's Monsanto, Ill., plant. Previous to that he had been group leader in the organic division's research department. He is a graduate of the University of Michigan in chemical engineering.

Monsanto has announced that Walter C. Thilking has been awarded a leave of absence to attend the advanced management program at the Harvard University School of Business Administration. He enrolls in the 13-week program for the spring term beginning February 25, with Louis F. Loutrel, Jr. Mr. Loutrel's award had been previously announced with that of Charles H. Sommer, Jr., whose enrollment was deferred because of the pressure of business. Management leaves of absence for the Harvard program were formally instituted by Monsanto in 1946. To date, four other Monsanto executives have received awards.

Mr. Thilking, assistant to the comptroller since January 1937, has been with the company since June, 1933. Mr. Sommer is manager of plasticizers and intermediate sales for the company's organic chemicals division. He plans to enroll at a later date. Mr. Loutrel is director of the company's Merrimac Division development department at Everett, Mass.

Borg-Warner International Corp., Chicago, Ill., will direct the export activities of the Asbestos Mfg. Co., Huntington, Ind., maker of AMCO Safety-Rated brand products, including a complete brake lining line for cars, trucks, and buses; clutch facings and other friction materials; fan belts; and rubber goods and hose. The Asbestos Company is one of the pioneers in the brake lining field. It has specialized in original equipment for many of the better-known makes of automobiles. This move reported above ties in with the general expansion of AMCO's product, market development, and advertising program, as well as with Borg-Warner International's plan to supply Borg-Warner overseas distributers with a complete range of nationally known and advertised automotive products.

Hodgman Rubber Co., Framingham, Mass., has moved its Chicago, Ill., office to 15 N. Jefferson St. E. J. Conniff is manager there.

Lake Shore Tire & Rubber Co., Des Moines, Iowa, is constructing a five-story warehouse building at its plant that will enable the plant to handle its raw materials and finished tires more economically.

Plymouth Rubber Co., Inc., Canton, Mass., has opened a sales office in Room 9112, Merchandise Mart, Chicago, Ill.

Acquires Bristol Plant

Minnesota Mining & Mfg. Co., St. Paul, Minn., has announced acceptance of its proposal to purchase a government owned manufacturing plant in Bristol, Pa. This transaction was handled by the Philadelphia office of the War Assets Administration.

The installation, built in 1942 for aircraft production, includes three buildings with a total floor area of 235,000 square feet, occupying 14.6 acres. When all details of the property transfer are completed, the company will exercise an option on 250 acres of land adjoining the plant. This could be used for future expansion.

According to W. L. McKnight, 3M company president, the plant has been acquired to provide additional manufacturing and warehousing facilities to serve the company's rapidly growing eastern markets. He said that production in the new plant will begin as soon as possible and that unless unexpected delays are encountered in the delivery of machinery and other equipment, production should be under way by mid-year.

Besides its adhesive and other rubber products, the 3M company makes about 140 varieties of "Scotch" pressure-sensitive tapes; it is one of the world's largest makers of abrasive products; it is a top producer of roofing granules; it makes "Scotchlite", the reflective sheeting used on signboards and highway markers.

Acquisition of the land and buildings, Mr. McKnight said, involves $1,500,000.

The manufacturing building is a masonry structure of one story, 221 by 580 feet with a mezzanine along one side. The two-story office building measures about 93 by 162 feet in the main part and has a wing in the rear 82 by 60 feet. The industrial relations building is a one-story structure 43 by 103 feet. The two smaller buildings are also of masonry.

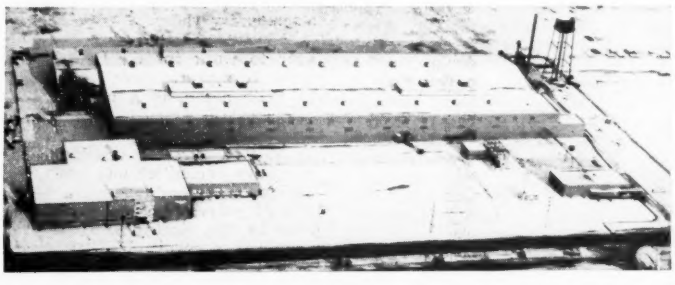
George H. Halpin, of 3M company, was elected a vice president of the National Wholesale Hardware Association at its recent annual meeting in Atlantic City, N. J.

Elmes Engineering Works of American Steel Foundries, 232 N. Morgan St., Chicago 7, Ill., through General Manager Charles F. Elmes, has announced the purchase of the complete line of ATF duplicate plate molding machines. These machines will be manufactured by Elmes for exclusive distribution by American Type Founders Sales Corp. The line consists of five models ranging in platen size from 14 by 14 inches to 24 by 24 inches. Among the features of the machines are a heating range from room temperature to 500° F., rugged steel construction, a timing clock for each operation, separate and automatic thermostatic control of each platen, and fingertip pressure control. The machines offer production from the original to the finished plate in 25 to 40 minutes, and additional duplicate plates can be made in any quantity in 15 minutes each. Duplicate plates are used in printing general commercial work, bags, containers, wrappers, envelopes, office forms, calendars, offset imprinting and production of plastic plates, multigraph plates, sterotypes, rubber stamps, bottle caps, wooden and metal pencils and lighters, rubber wall plaques, and other novelties.

Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill., has made H. Merrill Bowman district sales manager of the office in Baltimore, Md., assistant divisional sales manager for power transmission equipment, with headquarters at the company's Pershing Road plant in Chicago. Succeeding Mr. Bowman at Baltimore is Eugene S. Bogart, transferred from the Pittsburgh office, where he served customers in western Pennsylvania and northern West Virginia territories.

Mr. Bowman is a graduate of Temple University, previous to which he had also attended Drexel Institute of Technology for three terms. After summer employment at the Link-Belt Philadelphia plant, Mr. Bowman became permanently attached to that organization in 1932. The next six years were spent in the engineering, sales, and order departments. He was transferred to Baltimore in 1940 as district sales engineer and became district sales manager in 1945.

Mr. Bogart entered the employ of the engineering department of the Link-Belt positive-drive division at Philadelphia in 1926, upon graduation from Northeast High School. He remained in the department 10 years, meanwhile studying mechanical engineering in evening classes at Drexel Institute of Technology for 3½ years. He was moved to positive drive sales in 1936 and transferred to the company's Boston office in 1937 and to Pittsburgh in 1940, where he first served the positive-drive division and later became district sales engineer for both materials handling and power transmission products.



Aerial View of New Minnesota & Mining Property at Bristol, Pa.

EASTERN AND SOUTHERN

Hewitt Forms New Division

Hewitt-Robins, Inc., Buffalo, N. Y., on January 1 organized a new division, Robins Engineers Division, responsible for the contracting phases of materials handling and processing business of the company.

Since its formation in 1891 the Robins Conveyors organization has furnished long-line, high-capacity belt, conveyer transportation systems. Its services, however, have extended in many ways beyond just the manufacture and sale of its own principal line of conveying and screening machinery. These services have included the selection and supplying of other important elements for the complete material handling and processing plants designed and engineered by Robins, including electric motors and controls, specialized machinery for crushing, separating, measuring, and weighing the material being handled and processed, and heavy structures and buildings.

Because this engineering phase of Robins business has been growing at an accelerated pace it was decided to separate these specialized contracting operations into the new division. Other than this improvement of facilities and service no change is planned in basic selling policy.

Robins Engineers Division, with headquarters at 157 Chambers St., New York, N. Y., is headed by Vice President Harold Von Thaden, with the company 25 years. Vice president in charge of sales is Elmer C. Salzman, a 36-year employe; while Vice President R. W. Eichenberger, 38 years with the organization, will direct the Division's operations in the Midwest from the company's office at 7 S. Dearborn St., Chicago, Ill.

The manufacture of material handling machinery and related components will continue to be handled by Robins Conveyors Division at Passaic, N. J., which will also continue to handle all sales of these products except those involving extensive engineering designs and contractural operations as described above.

Hewitt also has named Monarch Electrical Co., LaSalle, Ill., a distributer of all the division's industrial hose, conveyer and transmission belting, and packing. Monarch, one of Central Illinois' leading supply firms, serves all local industry within a radius of 75 miles.

Commodity Exchange, Inc., 81 Broad St., New York, N. Y., on January 20 held its annual election at which nine governors were reelected, 16 were carried over from previous elections, and three new members were named to the board of governors, including Matthew S. Fox, as a representative of the Rubber Trade Group. Mr. Fox, a partner in the commodity brokerage house of Charles Slaughter & Co., at one time was engaged in the rubber exporting business in Singapore and during the late war was in South America assisting in the procurement of native crude rubber for the government.

Then, on January 22, the newly elected board of governors met to choose a president, a treasurer, and five vice presidents of the different trade groups of the Exchange. Edward L. McKendrew was reelected treasurer, and Floyd Y. Keeler, of Orvis Bros., was reelected treasurer. Herbert E. Meyer, president of Meyer & Brown Corp., was elected the vice president to head the Rubber Trade Group.

Du Pont Switches Executives

Crawford H. Greenewalt on January 19 became the tenth president of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., while Walter S. Carpenter, Jr., was elected chairman of the board, it was announced following the regular monthly directors' meeting. Mr. Carpenter's resignation as president and his designation as chairman of the board followed the retirement of Lammot du Pont from the latter post. Mr. du Pont's action brings to a conclusion a career in the company that began in 1902 and one that played a large part in the expansion and diversification of the company's activities. Besides assuming the presidency of the company, Mr. Greenewalt became chairman of the executive committee, of which he had previously been vice chairman, and a member of the finance committee. Mr. du Pont continues as a director, and Mr. Carpenter as a member of the finance committee.

At the same time it was announced that Walter J. Beadle, a vice president and member of the board, had resigned as treasurer of the company and had been elected to membership on the executive committee. T. C. Davis, first assistant treasurer, was elected treasurer to replace Mr. Beadle.

In a letter sent to the company's 97,000 stockholders Mr. Carpenter explained that the changes followed a practice that has become traditional in the company over a period of many years. This action, he explained, marks the fifth time, since the start of this century, that a du Pont president has resigned from that office at the age of 60 or less and has been replaced by a younger man.

The new du Pont president is 45 years old and joined the organization in 1922 as a chemist in the Philadelphia Works. Two years later he was transferred to the chemical department in Wilmington and became assistant director of the Experimental Station in 1939. He was made a director of the company in 1942 and in the same year was named chemical director of the Grasselli chemicals department. After working on the atomic energy program carried out by du Pont for the government, Mr. Greenewalt served successively as an assistant director of the development department and as assistant general manager of the pigments department. He was elected a vice president and member of the executive committee in 1946 and was made vice chairman of that committee last year. He was graduated from Massachusetts Institute of Technology with a B.S. degree in 1922.

Mr. Carpenter became president in 1940 of the company he had joined in 1907 as a temporary vacation employe in its dynamite plants. He left Cornell in his senior year to work for du Pont in Chile and spent two years there. In 1911 he came to Wilmington as a member of the development department. Six years later he was made director of the department and in 1919 a director and member of the executive committee and vice president in charge of the development department. He was 31 years old at the time. Three years later he was elected treasurer of the company and a member of the finance committee. In 1926 he was made vice chairman of the executive committee and in 1930 chairman of the finance committee.

Lammot du Pont was born in 1880 and received his degree in civil engineering from Massachusetts Institute of Technology in 1901. He joined the company in 1902 and in 1913 became general superintendent of the black powder department. Then in 1915 he was elected a director and member of the executive committee, and in 1916 a vice president, heading the company's miscellaneous manufacturing activities, including dyes, plastics, paints, and chemicals. He was president from 1926 to 1940.

Mr. Beadle is also a graduate of M.I.T., from which he received his B.S. degree in 1917. He joined du Pont in 1928 as a technical investigator in the development department. A year later he became assistant director of that department, where he served until 1942, when he was made an assistant treasurer of the company. He became first assistant treasurer in 1943 and a director, vice president, and treasurer in 1946.

Mr. Davis, a certified public accountant in New York and Delaware, was graduated from Bowman's College in 1918 and later completed graduate courses in accounting, taxes, and business law at Columbia University and La Salle Extension University. He came to du Pont in 1934 as manager of the tax division of the treasurer's department, was made assistant comptroller in 1941, assistant treasurer in 1944, and first assistant treasurer in 1946.

The company also has appointed R. E. Troutman, formerly manager of the pigments sales office in San Francisco, West Coast sales manager with headquarters in Los Angeles, Calif. He succeeds Joseph Shrawder, Jr., transferred to Wilmington, as manager of technical sales. R. P. Enslin, salesman in the company's western district office in Chicago, succeeds Mr. Troutman at San Francisco, Calif.

Mr. Troutman became manager of the San Francisco office in May, 1947, having gone there from Houston, Tex., where he was manager of du Pont's southwestern sales office for pigments.

Mr. Enslin was engaged in pigments sales in the Chicago office since 1935. Before transferring to sales, he worked as a chemist in pigments research for the company.

Dr. Shrawder is moving to Wilmington to take over a newly created post. As technical sales manager, he will direct the sales service laboratories at Newport, Del., for white pigments, and Newark, N. J., for color pigments. He has been in the Los Angeles area since 1938 as a technical service representative. Promoted to manager of West Coast sales January 1, 1947, he was a research chemist for pigments before transferring into sales.

The company announced at the same time that William J. Lawton and James C. Betty will assume duties as salesmen in the Chicago office. Both men go to Chicago from the company's Newark plant, where Mr. Lawton has been working as a chemist on dry colors and Mr. Betty has been working as a production foreman.

Triangle Conduit & Cable Co., Inc., New Brunswick, N. J., is erecting a one-story brick and concrete addition to its plant. When completed, the new structure, which will provide approximately 68,000 square feet of floor space, will be used to increase the company's production of insulated wire and cable.

Building Carbon Black Plant

Realizing the need of additional production of channel-type carbon black, Witco Hydrocarbon Corp. has been organized to process 15 million cubic feet of natural gas per day from the Barnhart pool in Reagan County, Tex.

Two plants are to be constructed. The gasoline plant will produce approximately 2,000 barrels of gasoline, butane, and propane per day. The residual gas will be burned in the second plant to make channel carbon black, which will be marketed by Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. Contract for the construction of the gasoline plant was awarded recently, and the Witco organization will erect the carbon black plant. These plants will cost about $3,500,000, and completion of the facilities is scheduled for July, 1948. These facilities will be located on two 80-acre tracts approximately one mile apart, and a spur railroad will be installed by the Panhandle & Santa Fe Railroad to connect the plants with the main line. The site has been designated as Witco, Tex.

The decision was made to build these facilities, despite high construction costs, because of the present need of channel black and the increasing demand for butane and propane. It is contemplated that future developments will include the processing of the hydrocarbons into various chemicals needed in industry.

The gas to be processed is produced from 48 wells having a daily production averaging 5,300 barrels of oil.

Robert I. Wishnick, president of Witco Chemical, heads the new corporation, which will operate the two plants, and C. E. McKinney is vice president in charge of operations.

Colonial Beacon Oil Co., 50 Rockefeller Plaza, New York 20, N. Y., reports that as of December 31 its assets and business were transferred to the Standard Oil Co. of New Jersey, a subsidiary of Standard Oil Co. (New Jersey), which for many years owned substantially all the stock of Colonial Beacon. The latter's products will, however, continue to be sold under the Esso brands, and no changes are contemplated in personnel or management.

Thompson, Weinman & Co., manufacturer of inert pigments, Cartersville, Ga., has added to its sales staff Thomas N. Loser, who will be headquartered at the company's New York, N. Y. office, 52 Vanderbilt Ave. A graduate of Wesleyan University, Mr. Loser served four years as a lieutenant in the United States Naval Reserve and more recently was with R. E. Carroll, Inc., in a sales capacity. Thompson, Weinman has a research laboratory at 92 Greenwood Ave., Montclair, N. J., and mills and mines at Cartersville, Tate, and McIntyre, all in Ga., Sparta, Tenn., Norristown and York, Pa., Waltham, Mass., Florence, Vt., Bloomington, Ind., and Sylacauga, Ala.

Warick Chemical Co., Division of Sun Chemical Corp., 580 Fifth Ave., New York 19, N. Y., has appointed J. J. Whitfield sales manager of the stearate division. Mr. Whitfield has been in charge of stearate sales in the Metropolitan New York Area for a number of years.

Rubber Products Featured at Motor Boat Show

The thirty-eighth annual National Motor Boat Show was held in Grand Central Palace, New York, N. Y., on January 9 to 17. As in previous shows, rubber was well represented, being shown in such applications as windshield stripping, foot rests, cable insulation, engine mountings, engine shaft belting, distributer caps, coaming rails, foam cushioning, and many others. Plastic articles were also featured in such uses as upholstery, steering wheels, cable insulation, compass housings, and other decorative and functional applications.

Approximately 247 exhibits comprised the show, which occupied four floors of the Palace and ran the gamut from large cruisers, cabin boats, runabouts, sail boats, engines, small craft, and accessories, through boat models, educational exhibits, and cruise publications. The B. F. Goodrich Co.'s rubber cutless propeller shaft bearings were featured on many of the boats exhibited and were also shown in the displays of distributers Lucian Q. Moffitt, Inc., and Olui Mikkelsen Co. The latter company also featured Goodyear Tire & Rubber Co.'s Airfoam latex cushioning, as did several other distributers. Goodrich's Koroseal and other vinyl plastic upholstery materials were extensively displayed.

Mikkelsen also showed the new Willis rotary rubber bearing, made by the E. J. Willis Co., and the new Step-On-It bilge pump, made by Hunt-Miller Co., which employs a rubber diaphragm and hose. The Owens Yacht Co. cruisers featured phenolic and rubber bearings for propeller shafts. The Norris Mfg. Co. displayed rubber mats made to order with inlaid designs of yacht club flags, boat names, or other special insignia. Penn Yan Boats, Inc., showed runabouts and small powered craft including the PlastiCraft boats with one-piece molded plastic hull.

Paint and varnish manufacturers were prominent among the exhibitors and included E. I. du Pont de Nemours & Co., Inc., which displayed Dulux marine finishes and varnishes. Marine cables and hawsers were shown by John A. Roebling's Sons Co. The Sperry Top-Sider Division of United States Rubber Co. exhibited a full line of rubber-soled footwear. Colonial Beacon Oil Co., Gulf Oil Corp., Socony-Vacuum Oil Co., Standard Oil Co. of N. J., and Texas Co. all had exhibits of their marine oils and lubricants and featured their cruise services, which include distribution of harbor and coastline maps, cruising guides, and cruise-planning advice.

The M. W. Kellogg Co., process engineer, 225 Broadway, New York, N. Y., has assigned W. E. Hanford to the newly created post of director of petroleum and chemical research. Dr. Hanford, who joined the organization in October, 1946, will coordinate the numerous and diverse research operations of Kellogg. In his new capacity he will have charge of all the company's laboratory work both at Jersey City, N. J., and as expanded by university fellowships. Prior to joining Kellogg, Dr. Hanford had been director of research for General Aniline & Film Corp. and before that had spent seven years with E. I. du Pont de Nemours & Co., Inc., first as research chemist and later in a supervisory capacity.

Reclaimers Elect New Officers

The Rubber Reclaimers Association, Inc., 250 W. 57th St., New York 19, N. Y., elected Carl R. Shaffer, president of Xylos Rubber Co., president of the Association for the year 1948, at the Association's annual meeting, January 6. H. S. Royce, Boston Woven Hose & Rubber Co., was chosen vice president, and Charles T. Jansen, *Rubber Age*, was again elected secretary-treasurer. The Association's executive committee is once again headed by Jean H. Nesbit, U. S. Rubber Reclaiming Co., Allyn I. Brandt, B. F. Goodrich Chemical Co., who was for many years an active participant in Association affairs but who no longer has occasion to deal with reclaimed rubber, was elected an honorary member of the Association.

Jefferson Chemical Co., Inc., owned jointly by The Texas Co. and American Cyanamid Co., has appointed J. W. Holmes sales manager, with headquarters at 30 Rockefeller Plaza, New York 20, N. Y. He is in charge of sales of commercial products. A graduate of McGill University, Mr. Holmes for several years handled technical sales of organic chemicals and neoprene for Canadian Industries, Ltd., in Montreal and Toronto. In 1942 he joined the Polymer Corp., Sarnia, Ont., as executive assistant to the managing director and later was placed in charge of technical service for Butyl rubber. During this period he worked closely with the rubber industry in Canada and the United States on the development of Butyl products. In 1945, he became manager of Polymer's sales and technical service division, handling GR-S and Butyl and other chemical products manufactured by Polymer, as well as the sale of natural rubber in Canada. Mr. Holmes is a member of the American Chemical Society and the Chemical Institute of Canada and a former chairman of the latter's Ontario Rubber Section.

New York Belting & Packing Co., Passaic, N. J., last month appointed Bonner & Barnewall, Inc., 92 Bleecker St., New York, N. Y., as its distributer for the New York area. J. Allan Machin, newly appointed vice president of Bonner & Barnewall, will supervise distribution of belting, hose, packing, and other industrial products made by New York Belting. Mr. Machin is well known in the mechanical rubber goods industry in the New York area and throughout the United States. Before becoming active in this field, he served for 18 years as general sales manager of Alexander Bros., belting manufacturer.

Herman Neumann, director of Neuman Hnos; exclusive distributer for Kelly Springfield Ltda., Argentine subsidiary of The Goodyear Tire & Rubber Co., Inc., arrived in the United States last month and has made his headquarters with the United States Foreign Corp., 761 Fifth Ave., New York 17, N. Y., for two months. The largest tire distributer in Northern Argentina, Dr. Neumann is here to secure representation—for the distribution of their products in Argentina—of American firms manufacturing electrical household appliances and supplies, farm machinery and equipment, sewing and office machinery, etc.

Executive Changes at U. S. Rubber

United States Rubber Co., Rockefeller Center, New York 20, N. Y., has appointed Donald L. McCollum manager of reclaimed rubber in the company's Naugatuck Chemical division, Naugatuck, Conn.; while Philip E. Rice returns to his former position as factory manager of the Naugatuck Chemical plant. During the period when Mr. Rice managed synthetic rubber plants in Los Angeles, Calif., and Institute, W. Va., Mr. McCollum was factory manager at Naugatuck.

Russell S. Tobias, formerly materials superintendent, has been made purchasing agent for the chemical division.

Howard R. Gaetz has been named the division's manager of sales and production coordination. His former position as superintendent of the synthetic rubber plant operated by U. S. Rubber in Naugatuck has been filled by A. K. O'Keefe, production superintendent at the rubber plant in Institute.

Mr. McCollum, a native of Naugatuck, was graduated in chemical engineering from Purdue University. He joined the rubber company in 1919 at its footwear plant in Mishawaka, Ind., returned to Naugatuck in 1926, became superintendent of reclaimed rubber production in 1931. Early in the war he was appointed production superintendent of Pennsylvania Ordnance Works, Williamsport, Pa. Later he became assistant factory manager of the synthetic rubber plant in Institute and, in 1945, factory manager at Naugatuck Chemical.

Born in Matawan, N. J., Mr. Rice obtained his early schooling in Brooklyn, N. Y. After serving in the Navy in World War I he attended New York University. He joined the rubber company's general laboratories as an assistant in 1923. Then for 20 years he was with Naugatuck Chemical, starting as chemist and reaching the position of factory manager in 1941. He was transferred to the Los Angeles synthetic rubber plant in 1945 and to Institute in 1947.

Mr. Tobias, whose home town is Bucyrus, O., was graduated from Ohio State and Franklin universities. He joined U. S. Rubber as a chemist at Pennsylvania Ordnance Works in 1942. The next year he was transferred to Naugatuck Chemical as materials control supervisor. In 1944 he became administrative assistant and in 1945 assistant to the factory manager. Last year he was appointed materials superintendent.

Mr. Gaetz was born in Red Deer, Alta., Canada. After graduation from University of Alberta, he did 2½ years of graduate work at the University of Washington. He served as automobile production line worker, cement plant chemist, lumberjack, and cannery hand in the Alaskan salmon country. Then he became active in the paper industry and at one time was in Australia as technical advisor to a group of paper manufacturers there. He joined U. S. Rubber at Pennsylvania Ordnance Works in 1942, where he became production superintendent. He later held the same position at the Kankakee Ordnance Works, Joliet, Ill., and the Institute synthetic rubber plant. He served in the Canadian R.A.F. in World War I and became a naturalized American citizen in 1940.

Mr. O'Keefe, a native of Fall River Mass., received his B.S. degree at St. Bonaventure College in 1930. After several years in the steel distribution business, he joined the rubber company's sales group for latex, Lotols, and dispersions. When war started, he was on the staff building the synthetic rubber plant in Naugatuck. He later was transferred to Institute as assistant production superintendent and last year was promoted to production superintendent at Institute.

The wire and cable department has announced the appointment of Frederick P. Combier as manager of branch sales. For many years he was vice president and sales manager of the Fibre Conduit Co.; he has also been vice president and sales manager of Hunter Douglas Corp., Circle F Mfg. Co., and Robeson-Rochester Corp. He was one of the original members of the Hotpoint sales organization, serving as salesman, district sales manager, and then managing director of the Canadian company. In his new position Mr. Combier will have supervision over 29 branches throughout the country distributing wire and cable products and U. S. Rubber's new conductive rubber heating panels.

L. B. Lillie has been appointed merchandise manager in charge of truck tires, retread and repair materials for the Fisk tires division. A native of Springfield, Mass., Mr. Lillie joined Fisk in 1946 as a sales representative covering Massachusetts, New Hampshire, and Vermont. Prior to this assignment he had spent four years in the army as a major in the transportation corps. He is a graduate of the University of Massachusetts, Class of 1935. Mr. Lillie will have his headquarters at the company's general offices in Rockefeller Center, New York.

Appointment of James K. Irvin of United States Rubber Export Co., Ltd., to a new post in Venezuela was announced last month by L. C. Boos, president and general manager of the company. Mr. Irvin becomes general sales manager of Royal Venezolana, C. A., an affiliate of the export company, with headquarters in Caracas. He will supervise the sale of company products in Venezuela and in the islands of Aruba and Curacao, said Mr. Boos. Royal Venezolana markets the complete line of U. S. Rubber Export products and also has its own plant for the manufacture of tire and tube repair and retread materials and shoe soles and heels. The company will soon start production of canvas rubber-soled footwear, Mr. Boos explained. Mr. Irvin, stationed in Venezuela for two years prior to the war, has for many years been associated with supply of rubber products used in oil fields. He has been with the export company since 1936, shortly after his graduation from Dartmouth College. His most recent position was that of assistant manager of the mechanical goods department in the company's New York office.

U. S. Rubber has opened a new subbranch at 722 W. Second St., Odessa, Tex., for the distribution of rubber products used by the West Texas oil industry. The new store will operate as a sub-branch of the company's branch at Dallas, Tex. It will be serviced by John R. Shackelford, resident field sales engineer, and Ed C. Stough and Joe F. Phillips, of Dallas, special oil field representatives.

W. M. Ballew, of Kansas City, Mo., southwestern sales manager of the company's mechanical goods division, said the branch will carry a complete stock of rotary, steam, and suction hose, packings, V-belts, and other products required in the production of petroleum.

U. S. Rubber will televise a series of films on various sports activities beginning on January 9 over the NBC network, according to C. J. Durban, assistant director of advertising. The programs, entitled "U. S. Royal Sports Time," will be telecast on Friday nights at 8:00 p.m. from New York, Philadelphia, Baltimore, Washington, and Schenectady. Instructive and entertaining, the programs will feature a series of track and field events showing athletes in training and in action. The films were made in cooperation with the United States Olympic Association and the Amateur Athletic Union.

General Electric Co., Schenectady, N. Y., has appointed Theodore F. Nessler to the newly created post of purchasing manager for its chemical department, Pittsfield, Mass. For the past eight years Mr. Nessler has been in charge of purchasing chemicals, castings, factory and foundry supplies for the company. He joined G-E in 1907 and has spent all his time in the purchasing department at Schenectady except for service during World War I.

Robert L. Gibson has been named manager of a newly created personnel division of the chemical department which has responsibility for matters pertaining to employe, union, and community relations and educational activities in the various divisions and plants of the department. Assisting Mr. Gibson will be Everett W. Bickford as manager of union relations, George M. Hartley as supervisor of planning and preparation, Karl B. McEachron, Jr., as manager of educational activities, and Arthur G. Sanford as manager of personnel services and safety.

Mr. Gibson has been with G-E since his graduation from Park College in 1925, except for one year when he served as public relations director for Lafayette College. He was assistant to Robert S. Peare, vice president in charge of advertising and publicity for G-E before being appointed advertising and sales promotion manager of the chemical department when it was formed in 1945. Mr. Gibson also will continue in the latter capacity.

Evans Research & Development Corp., 250 E. 43rd St., New York, N. Y., has added to its staff H. Roger Coleman, who, in addition to liaison activities between the corporation's laboratory and its clients, will devote considerable time to technical market surveys that have become an important phase of research laboratory management. Mr. Coleman formerly was manager of the special products division of General Aniline & Film Corp., and more recently was an independent consultant in powder metallurgy. Mr. Coleman is a graduate of Sheffield Scientific School, Yale University, and did graduate work at Columbia University.

Brown Co., 500 Fifth Ave., New York, N. Y., recently held a meeting of members of its pulp sales division to discuss and plan its 1948 Floc sales program. Subjects included the 1948 advertising program, new potential fields and prospects, production controls, research programs, market research on consuming fields, and sales and promotion activity. Sales forecast and regional territory quotas were established for all grades. Those attending these sessions were D. P. Brown, J. J. McDonald, R. M. Cleland, M. A. Hescock, W. L. Gilman, P. M. Goodloe, H. S. Chellis, T. L. Reiling, C. E. Duff, J. A. Elton, H. A. Eaton, R. J. Van Nostrand, W. A. Littlefield, and F. C. Stakel.

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OHIO

Jackson Firestone President

At the directors' meeting of The Firestone Tire & Rubber Co., Akron, on January 17 the following officers were elected: Harvey S. Firestone, Jr., chairman (chief executive of the company); John W. Thomas, honorary chairman; Lee R. Jackson, president (formerly executive vice president); John J. Shea, vice president in charge of finance; James E. Trainer, vice president in charge of production; Harold D. Tompkins, vice president in charge of sales; Harvey H. Hallinger, treasurer (formerly secretary); Joseph Thomas, secretary and general counsel (formerly assistant secretary and general counsel), and Claude A. Pauley, comptroller. Mr. Firestone had been president of the company.

Mr. Firestone presented Mr. Thomas with a wrist watch in recognition of his 40 years with the company, which he had joined in 1908 as a chemist.

Completion of details for transfer of a Des Moines, Iowa, wartime rubber plant to the Firestone company for $3,425,000 was announced last month by the War Assets Administration. The plant was built by the government in 1945 at a cost of $6,485,000 and was operated by Firestone during the war. Its production was heavy-duty tires for military use. Since the war the company has continued to operate the plant at capacity, manufacturing tires for farm tractors and other heavy equipment. Raub Snyder, WAA zone administrator, said the sale price was established when an agreement was reached on the value of personal property involved. The plant is located on a 70-acre tract of land and has approximately 245,205 square feet of floor space.

New president of The Firestone Steel Products Co. is John E. Martin, formerly vice president and director of American Type Founders, Inc. During the war Mr. Martin was deputy chief of the artillery division of the Ordnance Department. Prior to this assignment he had been general manager of the Link Belt Ordnance Co., Chicago, Ill., and had been associated with the Link Belt organization 18 years. A native of Covington, Ga., Mr. Martin attended Bryson College.

Firestone Tire & Rubber Co., Akron, has assigned the manufacture, distribution, and servicing of Firestone aircraft wheels and brakes to Hydra-Control Co., Pasadena, Calif. Hydra-Control, by the terms of the licensing agreement, takes over unfilled orders of the Firestone Aircraft Co., and will continue supplying and servicing former Firestone customers. Hydra-Control will furnish new assemblies and spare parts and will service existing installations as well as conduct an aggressive sales program for the Firestone-type wheels, brakes, and parts.

The Super-Balloon passenger-car tire, Firestone's entry into the low-pressure tire field, has been announced. The new tire features a new tread and shoulder design to go with the new lines of 1948 model automobiles, in addition to assuring a softer ride because of its lower air pressure. The tire also has wider road contact and gives greater driving stability, quicker stopping, and improved non-skid characteristics. Scientifically engineered skid-resisters are also being introduced in this tire to increase forward and lateral traction. All sizes of the Super-Balloon on new cars have a 15-inch rim diameter. Motorists now using conventional tires will be able to change over to Super-Balloon tires because Firestone has developed special sizes of the new tire to meet this change-over demand. The 6.70-15 Super-Balloon tire has an air volume 115 cubic inches greater than that of the corresponding conventional 6.00-16 tire and operates at 24 pounds' air pressure instead of 28 pounds.

Firestone has developed a new Polar Grip tire tread that has thousands of tiny suction cups which will grip icy and wet pavements with amazing effectiveness, it is claimed. Secret of the tread's extra safety and super traction is its Icocel construction, with thousands of small Icocel particles being molded into the rubber. As these particles are exposed by tire wear, they fall out and leave tiny suction cups in the tread which assure non-skid protection far superior to that of any conventional type of tire tread, Firestone states. The new Polar Grip tread can be applied to any worn passenger-car tire and comes in a choice of two designs: DeLuxe Champion for city and suburban driving; and Studded Ground Grip for cars operating on unimproved roads and in heavy snow or mud.

Foamex, the latex sponge cushioning material produced by Firestone Industrial Products Co., will be introduced into the postwar mattress market through Sealy, Inc., manufacturer and marketer of sleeping equipment. Foamex cushioning was shown in several styles of mattresses designed and manufactured by Sealy in its display rooms at the January Furniture Market in Chicago, Ill.

Oak Rubber Co., Ravenna, was among those exhibiting at the trade show sponsored by the National Association of amusement Parks, Pools, & Beaches at its recent annual convention in Chicago, Ill. Among those on hand at the exhibit of the balloon manufacturing company were C. W. MacDowell, sales manager; Ralph Bemister, Chicago representative; George Reed, production superintendent; Jack Shira, Jr., of the sales department; and Tom Gregory, editor of the company's house organ, *The Oak Leaf*.

Seiberling Rubber Co., Akron, begins the first course of its ThermoWeld treading and repair school February 16 at the company's sales and service laboratory in Barberton, it was announced last month by T. M. Hughes, manager of accessories and repair materials sales. Purpose of the school is to teach Seiberling dealers and their key employes the latest methods of treading and repairing tires. Trainees will learn the latest methods of recapping and repairing, using the most modern equipment available. Students may use any type of equipment, enabling them to become proficient in use of the same types used in their own shops.

Length of the base course will be four weeks, with a five-day work week, eight hours daily. Trainees may arrange to stay longer if they want to specialize in any phase of the various operations taught. The course is free to Seiberling independent dealers, with tools, equipment, and instruction furnished by the company. Enrollment applications are handled through the Seiberling field sales organization.

The Kelly Rubber Co., Massillon, is modernizing the two-story brick building containing about 20,000 square feet of floor space and also with railroad siding that it purchased in Navarre. The plant is now making household and light industrial rubber gloves of natural rubber, but later mills will be installed, and a limited line of molded goods will be produced. The Navarre plant now has 35 employes and expects 50 to 75 by the spring. Company executives include: W. F. Kelly, president; J. D. Ferrero, vice president; L. Shank, treasurer; Myron Johnson, manager, Massillon plant; L. Stuck, superintendent, Navarre plant.

The Glidden Co., Cleveland, has placed a contract with Blaw-Knox Co., for equipment and engineering to be used in modernizing its Cleveland plant. Blaw-Knox will supply and install new resin production equipment, design a new structure to house the equipment, and provide engineering for the remodeling of existing structures. Amount of the contract is about $100,000.

Completes Tire Mold Plant

Completion of what is believed to be the first plant in the history of tire making devoted exclusively to the manufacture of tire molds was announced last month by Boyd E. Bridgwater, vice president of The Bridgwater Machine Co., Akron. This new plant, known as the Athens Machine Division of The Bridgwater Machine Co., is in Athens, O., on 4½ acres of land, providing adequate space for future expansion.

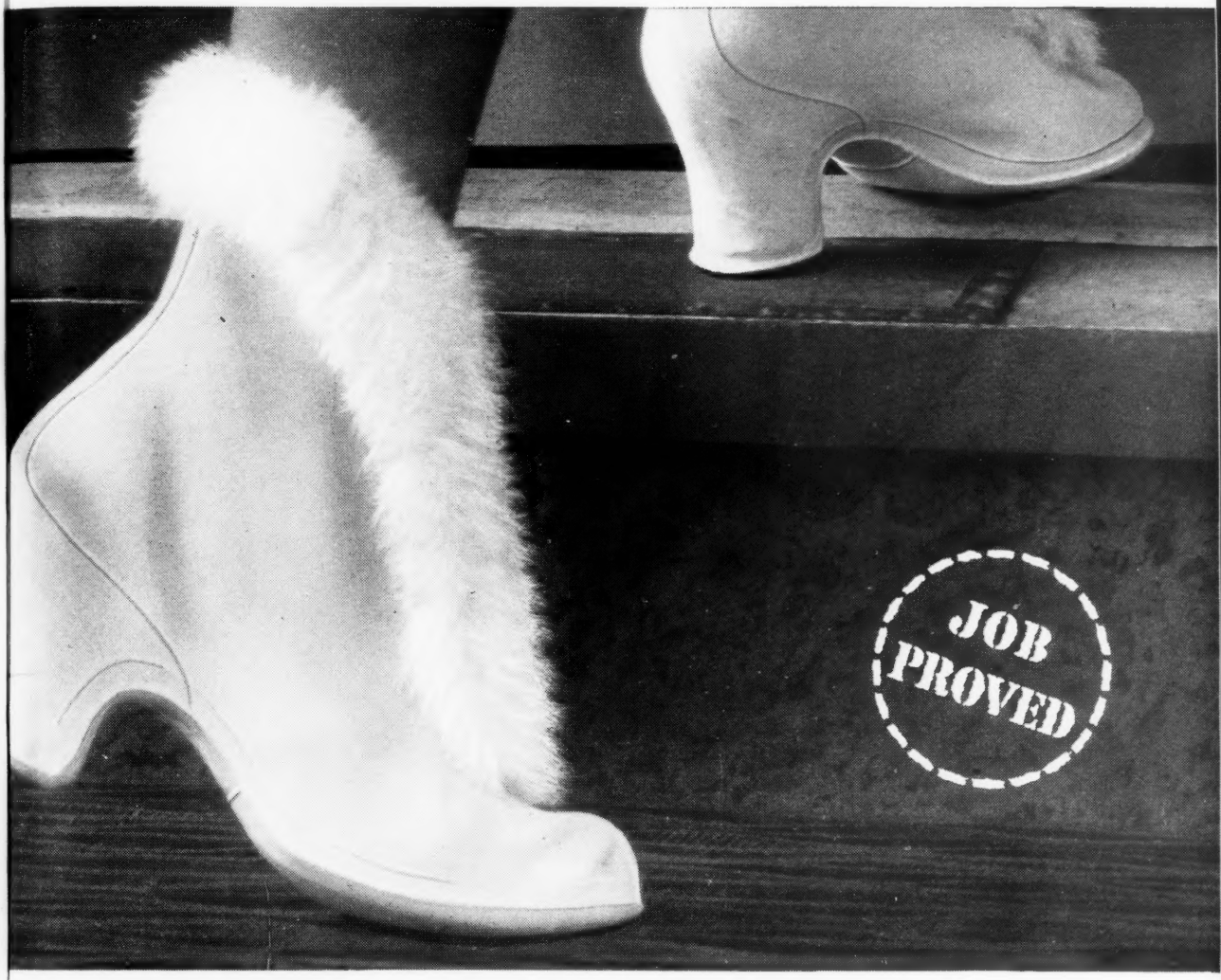
The division as present employs about 80 workmen.

Charles R. Dailey is plant manager.

"We have felt for a long time that a plant devoted exclusively to the manufacture of tire molds would result in many advantages to the user," said Mr. Bridgwater, who also stated that the new plant is equipped with many tools of the company's own design and manufacture.

Part of the Plant of Athens Machine Division, Bridgwater Machine Co.

Step Up Your Sales



SUN RUBBER PROCESSING AIDS . . .

Mean Clear, Clean Colors . . . Without Blooming . . . Without Discoloration

Color is America's No. 1 salesman. It makes customers stop and look. It often makes the difference between a product that people will buy and one that they will pass by.

If you manufacture rubber goods in white or pastel shades and are bothered with "blooming" or discoloration, have a talk with your nearest Sun Engineer. Sun makes several different rubber processing aids for natural, neoprene, reclaimed and GR-S synthetic rubbers. Sun processing aids are widely used and have been "Job Proved" in scores of major plants.

Sun Rubber Processing Aids are highly compatible with the different rubbers for which they are recommended. They prevent "blooming" and discoloration. They make possible more attractive, longer-lasting colors. They speed up milling and aid plasticization.

To step up sales with clearer, brighter colors . . . to cut down manufacturing costs . . . call your nearest Sun office. Or write Department RW 2.

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INDUSTRIAL PRODUCTS

SUN OIL COMPANY • ***Philadelphia 3, Pa.***
In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

Goodyear Announcements

By a vote well in excess of the required two-thirds, preferred shareholders of The Goodyear Tire & Rubber Co., Akron, recently approved the company's $100,000,000 financing program designed to provide additional capital for its expanded postwar business. Holders of 492,659 shares of $5 preferred stock, representing 82.8% of the outstanding issue, consented to an increase in the company's funded debt to $100,000,000, with only 2.6% opposed.

P. W. Litchfield, chairman of the board, announced after the stockholders' meeting that the company would proceed immediately with its plan to refund $36,000,000 first mortgage bonds now held by insurance companies and to borrow $64,000,000 additional from some of the same companies. The new money will be used for new product facilities and general improvements, for increased working capital, and for strengthening the financial structure of the company generally.

Upon completion of the financing, Goodyear will have outstanding $31,579,000 of 3½%—2¾% notes due 1964 and $68,421,000 of 3% notes due 1967. The present first mortgage will be canceled, and the entire $100,000,000 of debt will be in the form of unsecured promissory notes. The company has no current bank debt.

Salaried employes of the Goodyear organization throughout the United States who have 15 or more years of service will receive a three-week vacation this year instead of the customary two weeks previously granted. The increased vacation applies to those not represented by employe bargaining units in which vacations are a matter of contract and is effective as of January 1 of this year. Approximately 28% of all domestic salaried employes of the company will benefit by the new plan, which provides that the extra week of vacation be taken at a different time from the regular two weeks.

Three Goodyear representatives were guests of the U. S. Air Force at Ladd Field, Fairbanks, Alaska, during special cold-weather test operations conducted during the first two weeks in January. A. J. Peterson, Goodyear Aircraft sales representative, R. S. Ames, head of the plastic section of Goodyear Aircraft's research and development department, and K. R. Feise, Goodyear development engineer, made the trip to Alaska by transport plane. Mr. Feise represented the entire rubber industry at the tests. Of special interest to the Akron technicians were the performance of airplane wheels and brakes, rubber, plastics, and allied materials under cold test conditions.

John B. Rieker, veteran airship pilot and former U. S. Navy commander, has been added to the sales staff of the Goodyear Aircraft Corp., to act as special representative for the company's lighter-than-air interests. Mr. Rieker comes to his new job from that of pilot of the *Ranger*, L-type blimp in the Goodyear fleet now touring the East Coast. This Akron native was graduated from Ohio State University with the Class of 1929 with a B.A. degree. He immediately joined the pilot training program for lighter-than-air then being conducted at Wingfoot Lake. He received his license that same year and flew airships in the Goodyear fleet during the Chicago, New York, and Cleveland world fairs. He went on active duty with the Navy in 1939 and returned to Goodyear in August.

Larry T. Earley has been made manager of automotive jobbers' sales, a new department in Goodyear's sales organization, it was announced by H. D. Foster, manager of the mechanical goods division. The department will handle all accounts of automotive jobbers relative to fan belts, radiator hose, and other accessories. Production of these items for the general public was curtailed during the war, Mr. Foster said, and in his new post Mr. Earley will coordinate the sales service of the company's field staff in both the tires and mechanical goods divisions.

A native of Akron, Mr. Earley joined Goodyear in 1932, and his entire service has been in sales. For five years he was field representative in the Cleveland district and during the war was assigned to Goodyear Aircraft Corp., handling customer-engineering contacts. Since returning to the parent company two years ago he has been on the sales staff of the tire retread and repair materials department.

P. W. Litchfield, chairman of the board, Goodyear Tire & Rubber Co., has been chosen to receive the 1947 Public Relations Award of the National Association of Public Relations Counsel, Inc., for the greatest contribution during the year, through public relations, to the national welfare. Formal presentation of the Award was made on February 3, at the annual dinner of the Association, at the Waldorf Astoria Hotel, New York, N. Y.

Mr. Litchfield was voted the award primarily because of the sponsorship by his company of the weekly broadcast, "The Greatest Story Ever Told," a dramatization of the Bible. Commenting on this unusual type of industry-sponsored program, Mr. Litchfield stated that he and his associates had been "very much concerned over the spread of communism throughout the world, and the tendency of many countries, including our own, to think of material things and selfish interests rather than performing a service and recognizing the obligations which go with our opportunities."

A complete village of 100 Goodyear Wingfoot Homes is being shipped by truck to the U. S. Atomic Energy Commission installation at Los Alamos, N. M. Carroll L. Tyler, manager of atomic energy activities at Los Alamos, is in charge if the purchase and erection of the homes which will be used to house civilian workers and their families. Delivery on the 100 homes will be completed some time in February.

Airfoam, Goodyear's foamed latex product, is now available for use in domestic mattresses for the first time since the war. R. C. Hogan, manager of the Airfoam department, said the material will be marketed direct to mattress manufacturers for custom covering and inclusion in their marketing lines. Samples have been sent to all mattress manufacturers, and full production is expected to be under way early in the year. The material will be available in double- and twin-bed sizes and in thickness of 3.0 and 4.5 inches.

Mansfield Tire & Rubber Co., Mansfield, is erecting a new warehouse building at its plant. It is constructed of concrete blocks and steel and will provide 80,000 square feet of floor space, to be used for finished products and raw materials.

Joel M. Bowlby, since 1941 head of The Eagle-Picher Co., Cincinnati, has been elected to the board of directors of the Federal Reserve Bank of Cleveland for the unexpired term ending December 31, 1948.

CANADA

Monsanto (Canada), Ltd., Montreal, P. Q., recently announced that the merger of Laucks, Ltd., a wholly owned subsidiary, into Monsanto (Canada), Ltd., was completed by December 31. The process of assimilation of Laucks, Ltd., adhesive manufacturer with headquarters at Granville Island, Vancouver, B. C., into Monsanto (Canada), Ltd., has been under way for more than a year. Early in 1946 Monsanto (Canada), Ltd., acquired the capital stock of Laucks, Ltd., operating the company as a wholly owned subsidiary. Operations in Vancouver will be in charge of Branch Manager J. G. MacDermot.

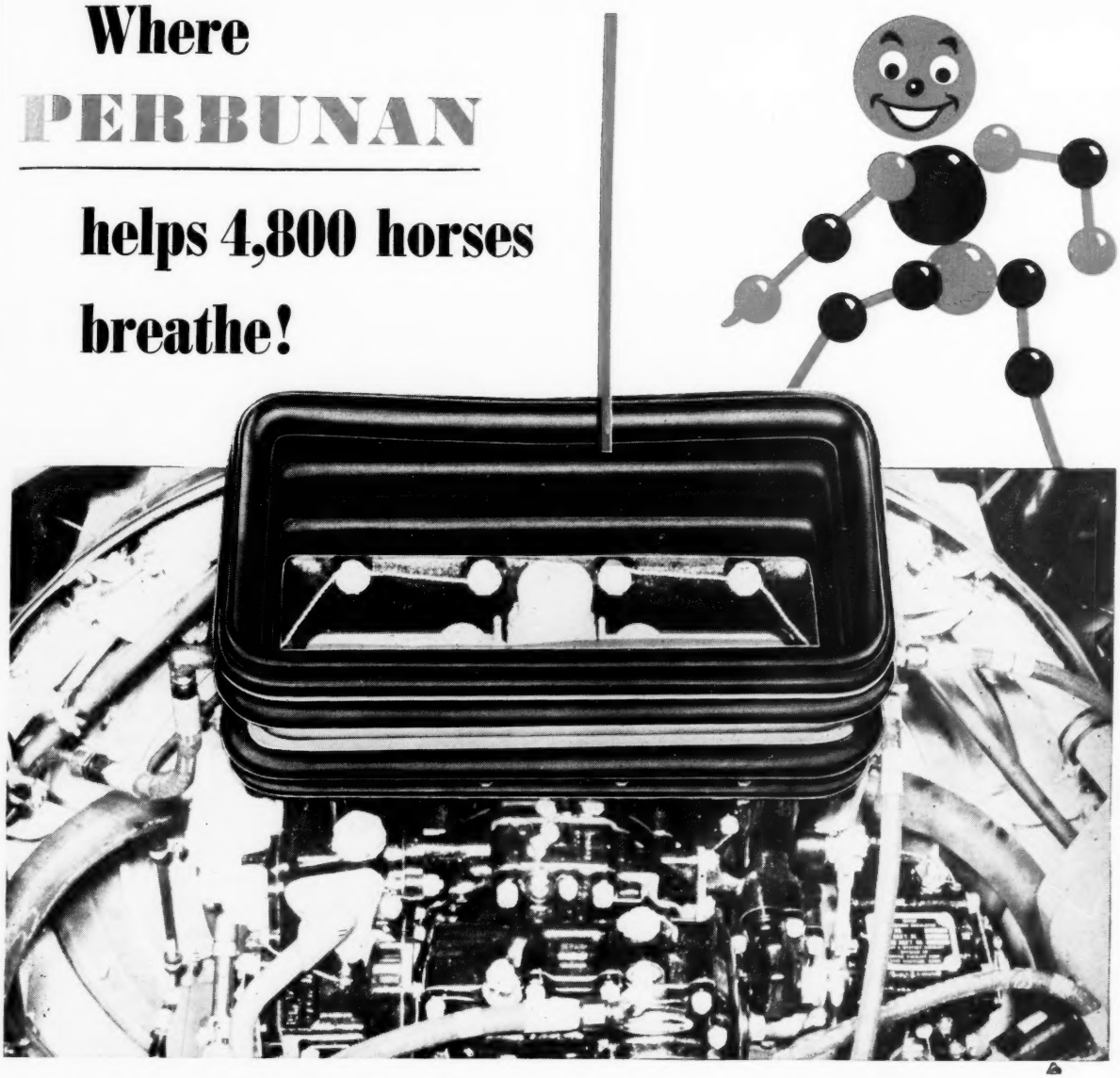
Officers of Monsanto (Canada), Ltd., include L. G. Ryan, president; Leo Ryan, vice president; J. P. Shea, treasurer; H. E. Potter, secretary; and K. B. Owens, assistant secretary. Coincidental with completion of the merger, Arnold H. Smith, former acting managing director of Monsanto (Australia) Pty. Ltd., will assume his duties as vice president and member of the board of directors of Monsanto (Canada), Ltd.

Dunlop Tire & Rubber Co., Ltd., Toronto, Ont., will erect a new factory at Whitby, Ont., with the initial plant to cost about $1,500,000. Construction will start early this year on a 55-acre tract acquired by the company at an undisclosed price. The move is in line with Dunlop's policy to secure adequate space for future industrial expansion, not available at the Toronto site. Situated alongside an existing railroad spur line, the new plant will cover 100,000 square feet and will require initially at least two million gallons of water per month to be pumped in on a special line from Lake Ontario.

Polymer Corp., Sarnia, Ont., has completed an arrangement with the Office of Rubber Reserve Washington, D. C., under which the latter will take all the Canadian plant's exportable surplus of GR-S up to next March 31. The announcement was made by J. R. Nicholson, Polymer executive vice president, upon his return from Washington. The exportable surplus of GR-S in this period will be 6,000,000 pounds at 18½¢ per pound, or a total of $1,110,000. Arrangements after March 31 will depend on the working out of long-range rubber plans by the United States.

A. Schrader's Son Division, Scovill Mfg. Co., 470 Vanderbilt Ave., Brooklyn 17, N. Y., has appointed Allan Rae, Toronto branch manager, succeeding S. A. Howell, who is retiring after 26 years with the Canadian branch plant. Mr. Rae, who joined the Schrader Canadian organization in 1935, had been assistant Toronto branch manager for the past decade. Previously he had been for 13 years associated with the sales department of Dunlop Tire & Rubber Goods Co., Ltd., in various capacities including that of assistant to the manager of car and truck manufacturers equipment sales. Mr. Rae is a member of the Canadian Section, Society of Automotive Engineers, Automotive Supplies Manufacturers Association, Canadian Manufacturers Association, Automotive Parts Section, Canadian Manufacturers Association, and an honorary member of the Commercial Travellers Association of Canada.

Where PERBUNAN helps 4,800 horses breathe!



THE FLEXIBLE COUPLING shown above is a mighty important item on the 4800 horsepower Pratt & Whitney engines used in the new Convair-Liner commercial transports.

It connects the air duct to the carburetor...carries in the tremendous feed of air needed for proper gasoline mixture. It has to have hot-temperature dependability...high resistance to oil and high octane gasoline...and lend itself to precise fabrication.

PERBUNAN NITRILE RUBBER was selected for this vital coupling after engineers of Consolidated Vultee and the technicians of Los Angeles Standard Rubber, Inc. ran many exhaustive tests and found Perbunan best suited for the job.

For rubber that resists oil, heat, abrasion and water...holds delicate colors...and stays flexible at low temperatures... write our nearest office.

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THE RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

ENJAY COMPANY, INC. 15 West 51st Street, New York 19, N. Y.; First National Tower, 106 South Main Street, Akron 8, Ohio; 221 North La Salle St., Chicago 1, Illinois; 378 Stuart Street, Boston 17, Massachusetts. West Coast Representatives: H. M. Royal Inc., 4814 Loma Vista Avenue. Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

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Binney & Smith, Ltd., 33 Edward St., Toronto, Ont., has added to its staff Carl M. Croakman, who will assist his father supplying the Canadian trade with carbon black, oxides of iron, bone blacks, and various dispersed products. Mr. Croakman is a graduate of the Colorado School of Mines, with a degree of engineer of mines, and is also a member of the American Institute of Mining & Metallurgical Engineers. In 1942 he worked with Goodyear Aircraft Corp., Akron, O., as a dimensional control engineer. Then from 1943 to 1945, Mr. Croakman served in the United States Army and spent 14 months with the Manhattan Project and several months after that with the Army Engineers in the Philippines. In 1946 and 1947 he was a mining engineer with New Jersey Zinc Co. at Austinville, Va.

Promotions at Stokes

Lloyd R. Leaver, president and managing director of Joseph Stokes Rubber Co., Ltd., Welland, Ont., announced that Lloyd J. Falkenhagen had been elected vice president and general manager of the company, at the annual meeting of the directors in Trenton, N. J., December 23.

Mr. Falkenhagen was born in Humberstone Township and received his education at the Welland High and Vocational School and the Robinson Business College in Welland. He started with Stokes in 1926 and progressed steadily with the company, having been appointed sales manager in 1933 and general manager in 1943.

Mr. Leaver also announced that James A. Skidmore had been appointed assistant treasurer of the company by the board at the same meeting. Mr. Skidmore joined Stokes in 1945, having been previously employed as a cost accountant at the Welland Chemical Co.

Allan Rae

Carl M. Croakman

Lloyd J. Falkenhagen

FINANCIAL

Armstrong Rubber Co., West Haven, Conn., and wholly owned subsidiary, Lake Shore Tire & Rubber Co., Des Moines, Iowa. Year ended September 30, 1947: consolidated net sales, $34,266,409; net consolidated income, $2,033,647 equal to $5.24 a common share; provision for federal income taxes, $1,245,097; current assets, $13,974,348; current liabilities, $6,469,977. No comparable figures are available for the preceding fiscal year, during which Lake Shore was not completely owned.

Dayton Rubber Co., Dayton, O. Twelve months ending October 31, 1947: net profit, $1,800,000, equal to $3.80 a common share, against $2,101,524, or $4.43 a share, in the period ending October 31, 1946.

Firestone Tire & Rubber Co., Akron, O., and subsidiaries. Year ended October 31, 1947: net income, $26,977,878, equal to $13.46 a common share, contrasted with $27,682,878, or $13.21 a share, in the preceding 12 months; net sales, $638,447,166, against $577,833,422; income and excess profits taxes, $17,750,000, against $31,850,000; provision for contingencies, $0, against $5,000,000; current assets, $225,500,073, against $200,914,656; current liabilities, $79,914,787, against $56,937,103.

Glidden Co., Cleveland, O., and subsidiaries. Year ending September 30, 1947: net profit, $13,757,984, equal to $7.57 a common share, compared with $5,715,015, or $2.95 a share, the year before.

Dow Chemical Co., Midland, Mich., and subsidiaries. Six months ended November 30, 1947: net profit, $9,096,337, equal to $1.61 each on 4,994,824 common shares, contrasted with $6,099,205, or $1.10 a share, in the same six months of 1946; charges, $15,604,633, against $10,026,727; provision for federal taxes, $5,681,712, against $3,927,552.

Johnson & Johnson, New Brunswick, N. J., and subsidiaries. First nine months, 1947: net income, $5,450,000, equal to $2.85 each on 1,818,326 common shares, against $5,262,000, or $2.79 each on 896,925 common shares, in the 1946 period; sales, $108,326,990, against $78,583,243.

Lee Rubber & Tire Corp., Conshohocken Pa., and subsidiaries. Year ended October 31, 1947: net income, $2,402,305, equal to $9.47 each on 253,584 common shares, against $2,153,338, or $8.91 a share, in the preceding 12 months.

Norwalk Tire & Rubber Co., Norwalk, Conn. Twelve months to September 30, 1947: net income, $201,574, equal to 99¢ a share, contrasted with $469,827, or $2.25 a share, in the preceding fiscal year; net sales, $9,913,258 against $10,426,518.

Rome Cable Corp., Rome, N. Y. Nine months ended December 31, 1947: net profit, $797,700, equal to $1.94 a common share, against $735,048, or $1.84 a share, in the 1946 months.

A. G. Spalding & Bros., Inc., New York, N. Y. Fiscal year ended with October, 1947: net earnings, $2,178,902, equal to $4.18 a share, against $1,469,935, or $2.82 a share, in the year ended October 31, 1946: sales, $24,242,499, against $19,480,017; net current assets, $9,112,203, against $8,519,905.

Sun Oil Co., Philadelphia, Pa., and subsidiaries. For 1947: consolidated net income, $24,339,912, a new high and equal to $5.28 each on 4,528,432 common shares outstanding, contrasted with $14,726,551, or $4.17 each on 3,434,944 common shares, in 1946.

Thermoid Co., Trenton, N. J., and subsidiaries. Nine months to September 30: net earnings, $610,973, equal to 77¢ each on 652,464 common shares, contrasted with $422,763, or 53¢ each on 602,464 shares, in the corresponding months last year; sales, $17,810,527, against $15,796,491; provision for federal taxes, $468,854, against $293,400.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. Nine months ended September 30: net profit, $860,813, or $2.88 each on 298,858 capital shares, compared with $1,144,860, or $3.73 each on 298,818 capital shares, in the corresponding period of 1946; provision for federal income taxes, $629,734, against $843,839; net sales, $14,378, 974, against $14,648,769.

("Dividends Declared" will be found on page 680.)

TALES WORTH RETELLING

(No. 1 of a series)

"BLOW HOT...BLOW COLD"

THIS is a story of the Man who lost his way in the woods one bitter winter night. A peasant found him and lead him to his cottage. On the way, the Man often raised both hands to his mouth and blew on them.

"What do you do that for?" asked the peasant.

"My hands are numb with cold and my breath warms them," said the Man.

Soon they arrived at the peasant's home where he put a smoking hot dish of porridge before them. When the Man raised his spoon to his mouth, he began blowing on it.

"And what do you do that for?" asked the peasant.

"The porridge is too hot, and my breath will cool it."

"Then get out of my house!" said the peasant, "I'll have nothing to do with a man who can blow hot and cold with the same breath."

★ ★ ★

In business, consistency is essential for continued success.

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APPLICATION

United States

2,431,811. **Elastic Suspenders for a Coverall.** H. Lang, St. Paul, Minn.

2,431,897. **Low Air Pressure Resilient Pneumatic Tire Including a Resilient, Airtight Casing with a Plurality of Elongated, Flexible Spaced-Apart Members within the Casing Extending Non-Radially with Respect to the Axis of Rotation of the Tire, and an Air Valve Connected with the Interior of the Casing.** A. E. Wensley, Schenectady, N. Y.

2,431,937. **Fluid-Operated Expander Having a Body of Rubber-Like Material.** W. H. Hunter, Akron O., assignor to B. F. Goodrich Co., New York, N. Y.

2,431,938. **Aerodynamic Device Including an Inflatable Bag Having Wings Secured to Both Sides.** D. C. Jalbert, Woonsocket, R. I.

2,432,050. **Vibration Mount Including a Pair of Relatively Rigid Elements Connected by a Resilient Member and Means for Dampening Vibrations between These Elements.** L. F. Thiry, Montclair, N. J., assignor to General Tire & Rubber Co., Akron, O.

2,432,202. **In a Printing Dispenser for a Pressure-Sensitive Adhesive Coated Tape, a Hard Rubber Printing Strip on a Roller.** E. W. Mason, Wyckoff, N. J.

2,432,365. **Waterproof Detachable Cover for Hand Carried Cases.** M. Allen, Brooklyn, N. Y.

2,432,427. **Strong and Highly Flexible Laminated Belt Formed of Woven Sheets of Cotton and Rayon Threads Bonded together by an Elastic Adhesive Material.** H. M. Kuhn, Clifton, N. J., assignor to United States Rubber Co., New York, N. Y.

2,432,457. **Repair Device for a Rubber Article.** N. Stevens, Chicago, Ill.

2,432,568. **Gas-Filled Cable System.** A. F. Gambitta, Jersey City, N. J., assignor to Phelps Dodge Copper Products Corp., Dover, Del.

2,432,627. **Breathing Apparatus for High Altitudes.** R. Margaria, Milan, Italy, vested in the Attorney General of the United States.

2,432,630. **Pneumatic Tire.** J. F. Purdy, assignor to Wingfoot Corp., both of Akron, O.

2,432,662. **Article Cover Including a Body of Flexible Material Having a Head and Neck Portion of Thermoplastic Film and a Rubber Band Enclosed in the Neck Portion.** C. E. Gardner, Queens, assignor to Gardner Industrial Associates, Inc., New York, both in N. Y.

2,432,672. **Steel Spring Tire.** J. V. Martin, Rochelle Park, N. J.

2,432,680. **Rubber Heel with Shank Supporting Extension.** H. H. Pifer, Norris, Ill.

2,432,714. **Captive Golf Ball.** L. Bedard, Montreal, P. Q., Canada.

2,432,717. **Washer-Type Compression Spring with Tubular or Sheathlike Elastic Covering.** E. W. Berger, assignor to Consolidated Vultee Aircraft Corp., both of San Diego, Calif.

2,432,719. **Suction Cup of Resilient Material.** F. C. Braun, New York, N. Y.

2,432,731. **Expanding Head for Abrasive Bands Including a Core of Dense Rubber Surrounded by and Bonded to a Annular Outer Expansible Body Portion of Rubber Having a Degree of Stretch.** O. S. De Haven, Beech Grove, assignor to Vonnegut Moulder Corp., Indianapolis, both in Ind.

2,432,747. **Resin-Coated Wall Tile.** E. R. Gilbert, Hamilton Square, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,432,847. **Tire Having a Tread Including a Circumferential Rib Divided by Cross-Slits into Wedge-Like Sections Displaceable under Pressure When in Contact with the Road.** E. C. Woods, Gravesend, assignor to Henley's Tire & Rubber Co., Ltd., Dorking, both in England.

2,432,928. **Flexible Transparent Optical Adhesive Sheet Which Is Weatherproof and Adapted for Use in Surfacing Outdoor Signs to Produce Reflex Reflection of Incident Light.** P. V. Palmquist, New Canada Township, assignor to Minnesota Mining & Mfg., Co., St. Paul, both in Minn.

2,432,947. **Waterproof Wrap-around Shoe Covering.** B. F. Thompson, Naugatuck, Conn.

2,433,046. **Garment Band Including a Strip of Thin Elastic Rubber.** H. Hardie, assignor to Nobelt, Inc., both of Baltimore, Md.

2,433,088. **Mask for Use in Delivering Oxygen at High Altitudes.** A. H. Balbulian, Rochester, Minn.

2,433,135. **Rubber Footwear with Front Pull Tab.** H. Malm, New York, N. Y.

2,423,210-211. **Ice-Cube Tray of Flexible Thermoplastic Material.** J. A. Gits, assignor to one-half to J. P. Gits, both of Chicago, Ill.

2,433,212. **Electrode Formed of Porous Carbon Impregnated with a Reisnous Polymer.** W. W. Gleave, Widnes, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,433,228. **Rubber Footwear with Adjustable Closure Means.** L. H. L'Hollier, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,433,233. **Means for Applying Electrotherapeutic Treatment Consisting of a Centrally Apertured Mask Including an Inner Layer of Non-Conducting Water-Resisting Material and an Outer Layer of Heat Insulating Material.** P. Meminger, Los Angeles, Calif.

2,433,262. **Woman's Garter.** F. I. Cook, Seattle, Wash.

2,433,303. **Rubber Sole for a Shoe for Climbing Mountains.** G. Spini, St. Moritz, Switzerland.

2,433,329. **Height Increasing Device for Insertion into a Shoe, Including a One-Piece Support of Resinous Material.** J. and A. H. Adler; A. H. and H. M. Adler and A. Lichtig, executors of J. Adler, deceased, assignors to A. H. and H. M. Adler, all of New York, N. Y.

2,433,602. **Reusable-Type Flexible Hose Coupling.** G. R. Coss, St. Clair Shores, assignor to Flex-O-Tube Co., Detroit, both of Mich.

2,433,686. **Saddle for Motorcycle Frames, etc., Including, as Its Main Body, a Relatively Deep Block of Molded Resilient Material Like Sponge Rubber.** S. du Pont, Wilbraham, assignor to Indian Motorcycle Co., Springfield, both in Mass.

2,433,768. **Inflatable High-Altitude Suit.** C. P. Krupp, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

445,202. **In a Cargo Container Including a Dome, a Flexible Skirt of Rubberized Material Attached to this Dome, and a Buffer Ring of Rubberized Material near the End of the Skirt.** All American Aviation, Inc., Wilmington, Del., assignee of H. W. Ballard, Merion, Pa., both in the U.S.A.

445,246. **Glass Fiber Reinforced Plastic Article.** Fiberglas, Canada, Ltd., Oshawa, Ont., assignee of E. White, R. Steinman, and L. P. Biefeld, all of Newark, O., U. S. A.

445,247. **Coupling Device for Making Connection between a Driving Shaft and a Driven Shaft.** General Tire & Rubber Co., Akron, O., assignee of E. P. Neher, North Manchester, Ind., both in the U.S.A.

445,347. **Resilient Car Wheel Including Integral Web and Rim Portions, a Hub Supporting Inner and Outer Cheek Elements, Rubber Cushions United to Metallic Plates; the Cushions Have Central Openings through Which the Hub Freely Passes.** Carnegie-Illinois Steel Corp., Pittsburgh, assignee of A. R. Schulze, Johnstown, both in Pa., U.S.A.

335,415. **Rubber Sole with Prismatically Shaped Ribs Arranged to Form Individually Closed Cross-Grooves between the Ribs.** K. Simon, Hallgren, Copenhagen, Denmark.

445,470 **Rub Apron Including a Fabric Base, a Cord Layer, and a Synthetic Rubber Layer thereon.** Dayton Rubber Co., formerly Dayton Rubber Mfg. Co., assignee of A. L. Freedlander and H. M. Bacon, all of Dayton, O. U.S.A.

445,471. **Spinning Cot Including a Body of Butadiene Rubber in Which Glass Fibers Are Incorporated.** Dayton Rubber Co., formerly Dayton Rubber Mfg. Co., Dayton O., assignee of R. C. Treue, Waynesville, N. C., both in the U.S.A.

445,529. **Composite Structure Including a Core of Light Cellular Material and Inner and Outer Metal Plates Permanently Bonded thereto by Means of Two Thermosetting Resin Adhesives.** United Aircraft Corp., East Hartford, assignee of H. B. Gibbons, Stratford, and E. G. Zoldy, Ridgefield, all in Conn., U.S.A

445,538. **Battery Including a Container at Least Partially Formed of a Thermoplastic Resin.** Willard Storage Battery Co., Cleveland, assignee of H. L. Koenug, Maple Heights, W. C. Billheimer, Euclid, and H. T. Havlick, Erieside, all in O., U.S.A.

445,539. **In a Shaft and Bearing Assembly, a Stationary Outer Member Having an Internal Working Surface of Metal, and Mounted within the Outer Member, a Rotatable Member Having a Working Surface of Rubber.** E. J. Willis Co., New York, N. Y., assignee of R. D. Smeallie, Teaneck, N. J., both in the U.S.A.

445,610. **In a Stop Cock for Use in Controlling High-Pressure Flow of Chemically Active Fluids, Including a Bore and Tapered Glass Plug, Retaining Means for the Plug within the Bore, Including a Ring of Relatively Soft Synthetic Plastic and a Resilient Ring of Synthetic Rubber against the Plastic Ring.** Fischer & Porter Co., Hattboro, assignee of N. Brewer, Newton, both in Pa., U.S.A.

445,642. **Printing Type Made of Two Layers of Vulcanized Microporous Rubber.** The National Cash Register Co., assignee of R. G. Chollar, both of Dayton, O., U.S.A.

445,625. **Polychrome Printing Form Constructed of a Plurality of Microporous Rubber Sections Capable of Absorbing Ink, and Ink-Impervious Partitions to Ink-Insulate the Sections from Each Other.** National Cash Register Co., assignee of R. G. Chollar, both of Dayton, O., U.S.A.

United Kingdom

594,126. **Compound Sheet Material Including a Fibrous Layer and a Waterproof Barrier Layer.** F. B. Dehn (H. H. Robertson Co.).

594,391. **Suspenders for Stockings and Socks.** H. F. Witt and R. D. Hall.

594,430. **Flexible Couplings.** Dunlop Rubber Co., Ltd., C. Macbeth, and G. W. Trobridge.

594,459. **Electric Cables.** H. W. Dutcher.

594,546. **Couplings for Rubber, Fabric, and Like Hoses.** Tecalemit, Ltd., and C. C. S. Le Clair.

594,705. **Pneumatic Floats for Ambulance Stretchers, etc.** A. N. Spanel.

594,767. **Tracks for Self-Laying Track-Type Vehicles.** B. F. Goodrich Co.

594,839. **Inflatable Load-Supporting Articles Such as Furniture Mattresses and Upholstery.** G. Ingram.

594,842. **Windshield Cleaner.** Trico Products Corp.

594,908. **Resilient Devices of the Rubber Compression Type.** Dunlop Rubber Co., Ltd., and G. W. Trobridge.

595,122. **Protective Finger Sheath for Surgical and Medical Use.** E. T. Wyman.

595,278. **Method of and Apparatus for Removing Ice from Surfaces Subjected to Icing Conditions.** B. F. Goodrich Co.

595,367. **Resin-Containing Paper or Paper Board.** Resinous Products & Chemical Co.

595,399. **Protective Coverings for Aircraft.** B. F. Goodrich Co.

595,439. **Highly Stretchable Yarn.** United States Rubber Co.

595,478 and 595,495. **Rubber Bands Used in a Process for Craping Paper and Other Materials.** Lilla Edets Pappersbruks, A. B.

595,506. **Impregnated Yarn and Fabrics thereof.** United States Rubber Co.

PROCESS

United States

2,431,873. **Coating Thermoplastics wih Silica.** R. G. Kennelly, Longmeadow, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,431,977. **Rubberized Cord Fabric for Automobile Tires and Other Rubber Articles.** S. W. Alderfer, assignor of one-half to E. D. Andrews, both of Akron, O.

2,432,074-075. **Rolls of Sheet Material with Cohesive Rubber Coating.** H. Y. Jennings, Clio, assignor to Copeman Laboratories Co., Flint, both in Mich.

2,432,752. **Laminated Resin Impregnated Stock Sheets.** H. C. Gray, Chicago, Ill., assignor to Continental Can Co., Inc., New York, N. Y.

2,432,870. **Resilient Plastic Ring.** G. J. Evalt, Philadelphia, Pa.

2,433,042. **Rubber Protector for Well Drill Pipes.** A. M. Graham, Paulding, O., assignor, by mesne assignments, to Thermoid Co., Trenton, N. J.

2,433,270. **Coating a Stitched Fabric with a Plastic Material.** I. Y. Goldman, Brooklyn, N. Y.

2,433,643. **Shaping Thermosetting Material.** W. I. Beach and R. L. Whann, Los Angeles, and A. S. Peterson, assignors to North American Aviation, Inc., both of Inglewood, both in Calif.

2,433,727. **Molding Thermoplastics.** O. M. Arnold, Troy, N. Y.

United Kingdom

594,175. **Insulated Electric Conductors.** W. T. Henley's Telegraph Works Co., Ltd., and J. Harvey.

594,178. **Repairing Pneumatic Tire Covers.** R. Antraigue.

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594,371. **Insulated Electric Conductors.** Callender's Cable & Construction Co., Ltd., J. Taylor, T. L. Osborne, and E. Tunnicliff.

594,372. **Manufacture of Plastic Products by Means of Synthetic Resins.** Salpa Française.

594,508. **Processing Soluble Dimethyl Silicone Gums.** British Thomson-Houston Co., Ltd.

594,635. **Centrifuging Aqueous Dispersions.** De Centrale Vereeniging tot Beheer van Proefstations voor de Overjarige Cultures in Nederlandsch-Indie, and G. J. van der Bie.

594,685. **Adhesive Attachment of Substances.** G. E. Heyl.

594,920. **Repairing Pneumatic Tire Casings.** E. Hellier.

594,943. **Making a Joint between the Ends of Waterproof Sheets.** D. W. R. Walker.

595,423. **Composite or Multiply Continuous Sheet or Web Material.** British Artificial Resin Co., Ltd., and W. J. Shrimpton.

CHEMICAL

United States

2,431,783. **Structure-Forming Solution of a Synthetic Linear Polycarbonamide in a Phenol Containing Alkaline Material.** W. W. Watkins, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,431,800. **Coating and Impregnating Composition Obtained by Emulsifying a Water Insoluble Polyvinyl Butyral Resin and a Solvent Plasticizer in Water.** A. J. Geiges, East Orange, assignor to Baker Castor Oil Co., Jersey City, both in N. J.

2,431,878. **Treating Dimethyl Silicone Polymer with Boric Oxide under Polymerizing Conditions at a Temperature between 100 and 250° C.** R. R. McGregor, Verona, and E. L. Warrick, Pittsburgh, both in Pa., assignor to Corning Glass Works, Corning, N. Y.

2,431,921. **Curing a Diisocyanate-Modified Polymeric Product, Obtained by Reacting a Hydrocarbon Diisocyanate with a Polymer Derived from a Mass Including Bifunctional Carboxylic Ester Forming Reactions, in the Presence of Benzoyl Peroxide.** J. G. Cook, Manchester, and R. C. Seymour, Birmingham, both in England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,431,956. **Dyeing an Article Composed of Acrylonitrile Polymer by Treating with a Naphthol First Component, Subjecting the Treated Article to an Aqueous Acid Solution, and Then Applying a Diazotized Naphthol Base Coupling Component for the First Component.** F. B. Moody, Pennsville, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,432,113. **Impregnating a Polyvinyl Polarizing Sheet with Tetraethyl Ortho Silicate.** A. Marks, Beechhurst, G. Weiss, Sunnyside, and A. R. Miller, Forest Hills, all in N. Y., Weiss and Miller assignors to Marks.

2,432,148. **In Curing the Reaction Product of a Hydrocarbon Diisocyanate and a Low Molecular Weight Linear Polymer with Paraformaldehyde and an Acid Curing Catalyst, the Step of Compounding in the Presence of a Thermal-Hardening Phenol-Formaldehyde Condensation Product.** W. Furness, L. E. Perrins, and W. F. Smith, Blackley Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,432,221. **Molding Material Consisting of a Piece of Coagulum Obtained from a Liquid Mixture of Rubber and Particles of Leachable Substance.** G. J. Wilson, assignor to National Cash Register Co., both of Dayton, O.

2,432,242. **Calendered Sheet Including a Mixture Containing a Monohydric Alcohol-Modified Urea-Formaldehyde Resin and a Hydroxyl-Containing Polyvinyl Acetal.** R. M. Leekley, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,432,296. **Composition Including a Chlorine-Containing Polymer Which Tends to Liberate HCl on Exposure to Heat or Light, and, as Stablizer therefor, an Aliphatic Mercapto Alcohol.** G. L. Dorough, Niagara Falls, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,432,353. **Making a Stereoreticulate Structure by Freezing a Foamed Aqueous Dispersion of Rubber and Then Passing a Coagulant, from the Outside, into the Interstices of the Frozen Structure.** J. A. Talalay, New Haven, Conn.

2,432,356. **Incorporating a Mono-(Alphaphenylethyl) Phenol into a Reaction Mixture of Phenol, Styrene, and Sulfuric Acid.** J. W. Underwood, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,432,386. **Reducing the Formation of Foam While Removing Volatile Steam-Distillable Substances from a Soap-Containing Aqueous Polymer Dispersion by Including a Water-Soluble Weak Inorganic Acid to Coagulate the Dispersion, and Then Steam Distilling.** D. Craig, Silver Lake, O., assignor to The B. F. Goodrich Co., New York, N. Y.

2,432,389. **Cellular Product from an Aqueous Emulsion Including a Water-Soluble Urea-Formaldehyde Resin, Vinyl Acetate Resin, and an Acrylic Resin.** L. E. Daly, Osceola, Ind., assignor to United States Rubber Co., New York, N. Y.

2,432,406. **Protective Solution for Fresh Fruit Including a Coumarone-Indene Resin Dissolved in a Highly Volatile Petroleum Distillate Solvent and an Ester of Sodium Sulfosuccinic Acid.** R. D. Gerwe, Clearwater, and M. A. Slade, Jr., Dunedin, both in Fla., assignors to Food Machinery Corp., San Jose, Calif.

2,432,447-448. **Removing Color from an Article Composed of a Polymer of Acrylonitrile.** R. A. Scheiderbauer, Kenmmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,432,458. **Separation of Diolefins from Hydrocarbon Mixtures with Cuprous Ammonium Formate Solutions.** H. C. Thober and R. G. Bowers, both of Toledo, O., assignors to Sun Oil Co., Philadelphia, Pa.

2,432,460. **Resinous Copolymer Obtained by Polymerizing Equimolecular Proportions of Methyl Isopropenyl Ketone and an 1-Acyloxy-1,3-Butadiene.** C. C. Unruh and W. O. Kenyon, assignors to Eastman Kodak Co., all of Rochester, N. Y.

2,432,470. **Converting Dichlorosuccinic Anhydride to Monochloromaleic Anhydride by Heating in the Presence of a Catalyst of the Group of the Chlorides and Sulfates of Iron.** A. M. Clifford, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,432,471. **Composition of a Polyvinyl Acetal Formed from Polyvinyl Alcohol and an Aliphatic Aldehyde Which Contains Guanidine Carbonate as Stabilizer for the Acetal.** F. W. Cox, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,432,474. **Synthesis of Organic Oxygen-Containing Compounds.** W. F. Gresham, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,432,480. **Copolymer of a Mixture of Ethyl Alpha-Chlorocrotonate and Butadiene-1,3.** J. R. Long, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,432,511. **Acrylonitrile Stabilized with a Substance from the Group of Ammonia, Ammonium Carbonate, and a Cyanoethylamine.** H. S. Davis, Greenwich, and O. F. Wiedeman, Old Greenwich, both in Conn., assignors to American Cynamid Co., New York, N. Y.

2,432,521. **Rendering Cellulose Esters Resistant to Actinic Rays by Treatment with an Aryl Ester of Salicylic Acid.** W. Horback, Newark, and W. D. Paist, Orange, both in N. J., assignors to Celanese Corp. of America, a corporation of Del.

2,432,542. **In a Process for Producing a Moisture-Proofed Wrapping Tissue, the Application to a Cellulosic Base Film of a Partially Polymerized Melamine-Formaldehyde Resin Dispersed in a Medium Including a Non-Basic, Water-Soluble Alcohol and Hydroxy Acetic Acid.** G. Pitzl, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,432,544. **Producing a Fusible Thermoplastic Composite Resin Including an Aromatic Amine-Aldehyde Resin and a Fusible Resorcin-Aldehyde Resin.** P. H. Rhodes, Portland, Me., assignor, by mesne assignments, to Koppers Co., Inc., a corporation of Del.

2,432,586. **Plastic Composition Including a Chlorine-Containing Resin Normally Subject to Deterioration on Exposure to Heat and, as Inhibitor of Such Deterioration, a Ketone-Soluble Resinous Ester-Amide of a Dicarboxylic Acid and an Aryl Secondary Monoalkylolamine.** R. W. Quarles, Pittsburgh, Pa., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,432,601. **Interpolymer of a Vinylidene Compound Containing a Carboxylic Ester Group with a Monomeric 2-Vinyl Substituted-1,3-Dioxacycloalkane.** R. H. Wiley, Lancaster Village, Del., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,432,623. **Enamel Containing Furfuryl Alcohol Condensate and Polyvinyl Acetal.** H. J. Kauth, Schenectady, assignor to General Cable Corp., New York, both in N. Y.

2,432,665. **Liquid Polymeric Phenylalkylsiloxanes.** J. F. Hyde, assignor to Corning Glass Works, both of Corning, N. Y.

2,432,686. **Manufacture of Resins from a Mixture of Olefins Including Propylene, Butene-2 and Butene-1, and Sulfur Dioxide.** A. K. Scribner and F. W. Wilder, both of Portsmouth, Va., assignors, by mesne assignments, to Phillips Petroleum Co., a corporation of Del.

2,432,737. **Dichlorostyrenes.** E. R. Erickson and J. C. Michalek, both of Niagara Falls, assignors to Mathieson Akali Works, Inc., New York, both in N. Y.

2,432,891. **Silicon-Containing Resins.** L. R. B. Hervey, Concord, Mass., assignor to Arthur D. Little, Inc., a corporation of Mass.

2,432,975. **Dinitroso-diphenyl Guanidines.** J. A. Teicher, Erdington, Birmingham, and D. F. Twiss, Sutton Soldfield, both in England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

2,432,991. **Nuclear Acylation of a Thiophene.** H. D. Hartough, Pitman, and J. J. Sardella, Woodbury, both in N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,433,015. **Preparation of Long-Chain Fatty Acids by Reacting Ethylene with a Carboxylic Acid.** J. R. Roland and J. Harmon, assignors to E. I. de Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,433,016. **Preparation of Long-Chain Fatty Acids by Reacting Ethylene with an Alkanoic Carboxylic Acid.** D. D. Coffman, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,433,025. **Continuous Low-Temperature Copolymerization of Material Including a Major Proportion of Isobutylene and a Minor Proportion of a Conjugated Diolefin Having from 4 to 10 Carbon Atoms per Molecule.** J. D. Calfee, Westfield, and R. M. Thomas, Union, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,433,030. **Separating Olefins from a Predominantly C$_4$ Hydrocarbon Feedstock.** J. H. Cone, Goose Creek, Tex., assignor to Standard Oil Development Co., a corporation of Del.

2,433,045. **Recovery of Polymerized Olefins.** J. P. Hamilton, Buffalo, N. Y., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,433,047. **Polymerization of a Vinylidene Compound Mixed with 2,7-Dichloro Diphenylene Sulfone under the Influence of Ultra-Violet Light.** R. F. Hayes, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,433,060. **Stripping Unpolymerized Unsaturated Materials from a Latex Prepared by Emulsion Polymerization.** E. O. Ohsol, Rahway, and W. W. Waterman, Cranford, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,433,062. **Lacquer-Containing Vinyl Resin and Phenolic Resins.** E. C. Pfeffer, Jr., Oak Park, and F. M. de Beers, Jr., Evanston, both in Ill., assignors to Continental Can Co., Inc., New York, N. Y.

2,433,070. **Copolymerization at Low Temperature of Isobutylene and a Conjugated Diolefin Having 4 to 10 Carbon Atoms per Molecule.** W. J. Sparks and J. D. Calfee, both of Cranford, N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,433,097. **Composition Including a Polyvinyl Acetal Resin and a Partial Ester of Glycerine and an Unsaturated Aliphatic Carboxylic Acid.** M. O. Debacher, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,433,098. **Composition Including a Polyvinyl Acetal Resin, a Partial Ester of Glycerin and an Aliphatic Monobasic Carboxylic Acid, and an Aldehyde Reaction Product.** M. O. Debacher, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,433,168. **For Mold Compositions for Casting Metals, a Binder Containing a Melamine-Formaldehyde Condensation Product, a Urea-Formaldehyde Condensation Product, and a Hardening Agent of Weak Acid Nature.** H. Staeger, assignor to Gesellschaft zur Förderung der Forschung auf dem Gebiete der Technischen Physik an der Eidg. Technischen Hochschule G. T. P., both of Zurich, Switzerland.

2,433,179. **Reclaiming Rubber with the Aid of an Aryl Selenide at a Temperature of 100 to 250° C.** G. P. Wheeler, Akron, O., assignor to B. F. Goodrich Co., New York.

2,433,357. **Vulcanizing a Polyisopropylene Ethylene Sebacate Maleate Elastomer to a Metal Base with the Aid of a Coating of Drying Oil Modified Glycerol Phthalate.** C. S. Fuller, Chatham, assignor to Bell Telephone Laboratories, Inc., New York, both in N. Y.

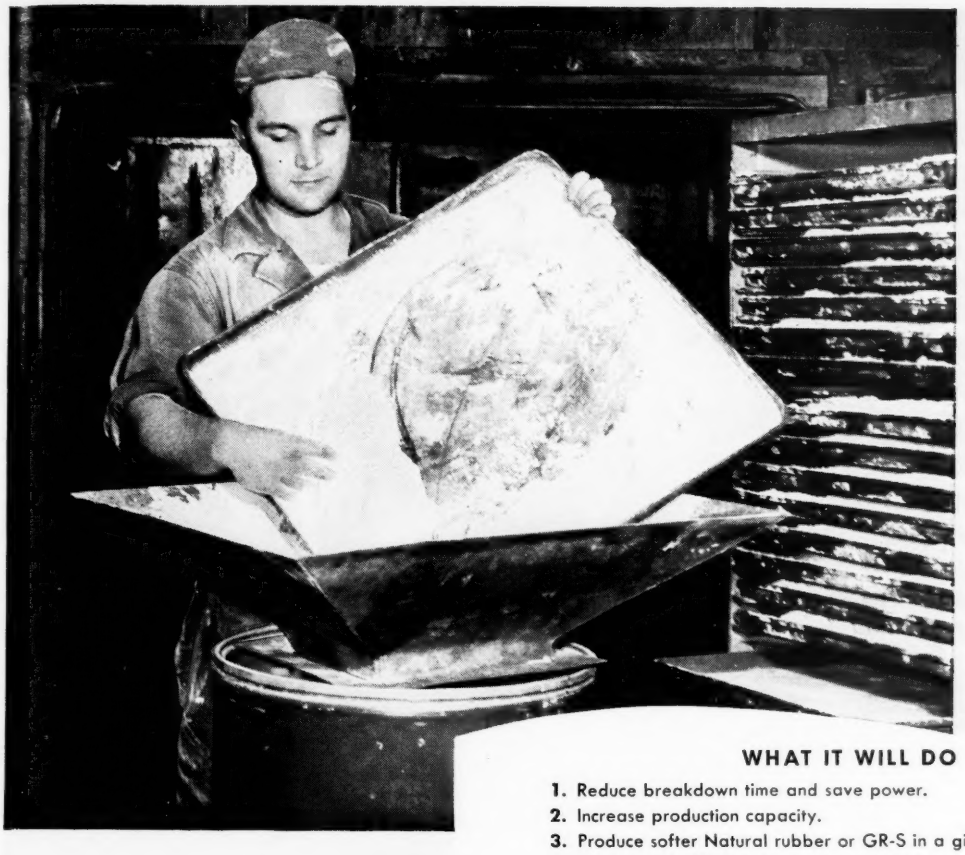
2,433,372. **Preparing Solid Dimeric Alpha-Methyl Para-Methyl Styrene by Heating Alpha-Methyl Para-Methyl Styrene.** B. H. Kress, assignor to Federal Telephone & Radio Corp., both of New York, N. Y.

2,433,465. **Process for Effecting the Separation of a Monoolefin from a Diolefin.** L. N. Leum, Upper Darby, S. J. Macuga, Landsdowne, and S. I. Kreps, assignors to Atlantic Refining Co., both of Philadelphia, all in Pa.

2,433,500. **Alpha-Cyclopropyl Acrylonitrile.** T. F. Wood, Clifton, N. J., assignor to United States Rubber Co., New York, N. Y.

2,433,595. **Compositions Including Natural or Synthetic Rubber with, as Plasticizer therefor, an N-Substituted Carbamate.** A. W. Campbell, assignor to Commercial Solvents Corp., both of Terre Haute, Ind.

2,433,616. **Resin Formed by Polymerization of Diallyl Phthalate and Stablized by Methyl Iodide.** K. E. Marple and E. C. Shokal, Oakland, assignors to Shell Development Co., San Francisco, both in Calif.



Transferring PEPTON 22 Plasticizer from trays in drying oven to drum at Calco plant.

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4. Produce soft GR-S with plasticities which show no appreciable change on standing.
5. Control GR-S gel build-up in hot processing.
6. Plasticize reclaimed rubber, mixtures of reclaimed rubber and Natural rubber or GR-S, and also mixtures of Natural rubber and GR-S.
7. Produce softer or more plastic Natural rubber or GR-S mixed stocks in direct mixing.
8. Reduce heat developed in processing and thereby lower the processing temperatures.
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10. Give good physical properties.

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3. It will *not* bloom.
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2,433,646. **3-Acetoxy-Methylene, 3,6 Endoxohexahydrophthalic Acid Ester as Plasticizer.** W. P. Bitler, Haverstraw, and L. Nicholl, Nyack, assignors to Kay-Fries Chemical, Inc., West Haverstraw, all in N. Y.

2,433,656. **Dispersing Rubber in a Polar Organic Liquid Medium Non-Solvent for Rubber.** C. H. Egan, Belmont, A. J. Leydon, Waltham, and J. P. Fahey, Cambridge, assignors to Dewey & Almy Chemical Co., North Cambridge, all in Mass.

2,433,680. **Dry Adhesive Film from a Urea-Formaldehyde Condensation Product.** O. E. Backman, Tammerfors, Finland.

2,433,721. **Heating at Polymerizing Temperature a Mixture of Polylactylic Acids, Fatty Drying Oils, and a Member of the Group of Fumaric Acid, Maleic Anhydride and Mixtures of Fumaric Acid and Maleic Anhydride, to Partial Polymerization, Then Adding a Modifying Agent and Continuing Heating until a Viscous, Elastic, Resinous Product Is Formed.** P. D. Watson, Arlington, Va., assignor to the United States of America, as represented by the Secretary of Agriculture.

2,433,776-780. **Stable and Substantially Anhydrous Organosols.** M. D. Marshall, Arlington, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,433,800. **Production of Butadiene from Normal Butane.** C. C. Watson, assignor to Universal Oil Products Co., Chicago, Ill.

Dominion of Canada

445,203. **Producing Butadiene-Styrene Copolymer Vulcanizates of Improved Tensile Strength and Tear Resistance by Incorporating Paracoumarone Resin and Non-Black Filler from the Group of Calcium Carbonate and Magnesium Carbonate.** Allied Chemical & Dye Corp., New York, N. Y., assignor of T. A. Bulifant, Hackensack, N. J., both in the U.S.A.

445,231. **Insulation Composition Including Crystalline Chlorinated Diphenyl Benzene and Crystalline Chlorinated Diphenyl Oxide.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of F. M. Clark, Pittsfield, Mass., U.S.A.

445,279. **Beta-Bromacrylic Acid.** Shell Development Co., San Francisco, assignee of H. de V. Finch, El Cerrito, and S. A. Ballard, Oakland, all in Calif., U.S.A.

445,286-287. **Curing a Copolymerized Vinyl Chloride-Vinylidene Chloride Plastic.** Wingfoot Corp., assignee of T. H. Rogers, Jr., and R. D. Vickers, all of Akron, O., U.S.A.

445,289. **The Class of Substituted Ethyl 2-Thiazyl Sulfides Including the Cyano-Amido- and Carbalkoxy-Ethyl Thiazyl Sulfides.** Wingfoot Corp., Akron, assignee of A. M. Clifford and J. G. Lichty, both of Stow, both in O., U.S.A.

445,366. **For an Adhesive Sheet, a Firm Yet Flexible Intermediate Barrier Coating Composed of Synthetic Rubber, a Compatible Resin, Plasticizer, and Filler.** Johnson & Johnson, Ltd., Montreal, P. Q., assignee of C. O. Pike and V. N. Morris, both of Highland Park, N. J., U.S.A.

445,395. **Mixed Esters of Cellulose.** C. Dreyfus, New York, N. Y., assignee of G. W. Seymour and B. B. White, both of Cumberland, Md., both in the U.S.A.

445,449. **Composition Including a Hard Product of Polymerization of a Mixture Including an Isolated Fusible Partial Polymer of Divinyl Benzene and Styrene.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U.S.A.

445,454. **Water-Soluble Organic Compounds for Waterproofing Textile Fibers Produced by Reacting with a Tertiary Base upon the Reaction Product of a Metal Thiocyanate with Methylene Halide Compound.** Canadian Industries, Lt., Montreal, P. Q., assignee of J. Pikl, Pitman, N. J., U.S.A.

445,472. **Manufacture of Vinyl Chloride by Passing Acetylene and Hydrogen Chloride into a Suspension in Paraffin Oil of Active Carbon Impregnated with Mercuric Chloride.** Distillers Co., Ltd., Edinburgh, Scotland, assignee of H. M. Stanley, Tadworth, Surrey, England.

445,490. **Stabilizing Polymerizable Vinyl Aromatic Compounds against Polymerization by Mixing with a 2,5 Substituted Hydroquinone.** Mathieson Alkali Works, New York, assignee of R. R. Erikson, Niagara Falls, both in N. Y., U.S.A.

445,501. **Allyl Phthalyl Vinyl Glycolate.** Pittsburgh Plate Glass Co., Pittsburgh, Pa., assignee of I. E. Muskat and F. Strain, both of Akron, O., both in the U.S.A.

445,613. **Preparing a Vinyl Halide by Reacting Acetylene with Hydrogen Chloride in the Vapor Phase in the Presence of a Catalyst Including, as Essential Component, a Bivalent Mercury Compound.** B. F. Goodrich Co., New York, N. Y., assignee of J. A. Bralley, Akron, O., both in the U.S.A.

445,642. **Preparing a Stable Aqueous Emulsion of Polyvinyl Acetate by Emulsifying in the Presence of a Partially Hydrolyzed Polyvinyl Acetate and Heating and Stirring the Emulsion in the Presence of a Peroxide Catalyst.** Shawinigan Chemicals, Ltd., Montreal, P. Q., assignee of H. M. Collins and M. Kiar, both of Shawinigan Falls, P. Q.

United Kingdom

594,154. **Stabilizing Organo-Siloxanes.** R. Haddan (Corning Glass Works).

594,382. **Condensation Products from Substances Containing Reactive Methylene or Methine Groups.** C. Weizmann.

594,249. **Copolymers of Tetrafluoroethylene.** Imperial Chemical Industries, Ltd. (E. I. du Pont de Nemours & Co., Inc.).

594,330. **Coating Compositions.** E. I. du Pont de Nemours & Co., Inc.

594,378. **Plasticizers for Thermoplastic Compositions.** A. J. Daly and W. G. Lowe.

594,348. **Amino-Type Resins as Employed for Acid Adsorption.** T. R. E. Kressman.

594,457. **Processing Synthetic Rubber Latices.** Firestone Tire & Rubber Co.

594,462. **Vinyl Resin Coating Compositions.** Carbide & Carbon Chemicals Corp.

594,481. **Di-Methyl Silicone Elastomers.** British Thomson-Houston Co., Ltd.

594,485. **Hydrolyzing Dimethyldihalogenosilanes.** British Thomson-Houston Co., Ltd.

594,506. **Dimethyl Silicone Elastomers.** British Thomson-Houston Co., Ltd.

594,579. **Moldable Compositions.** Bakelite, Ltd., N. W. Knewstubb, and J. H. Bennitt.

594,638. **Heat-Insulating Material.** Ruberoid Co., Ltd. (Ruberoid Co.).

594,653. **Granular or Globular Polymerization Product.** Vinyl Products, Ltd., and J. E. O. Mayne.

594,686. **Rubber-Like Compositions.** Firestone Tire & Rubber Co.

594,717. **Polyvinylidene Chloride.** Distillers Co., Ltd., C. A. Brighton, and J. J. P. Staudinger.

594,791. **Condensation Products from Dicyandiamide.** Geigy Co., Ltd., F. L. Goodall, R. Schilling, and J. V. Summergill.

594,796. **Product Causing Rubber to Adhere to Another Material.** Auxiliaire de L'Institut Français du Caoutchouc.

594,818. **Olefin-Polysulfide Compositions.** Anglo-Iranian Oil Co., Ltd., E. W. M. Fawcett, and A. Millen.

594,830. **Plastic Compositions Based on Polyvinyl Acetals.** Soc. des Usines Chimiques Rhone-Poulenc.

594,871. **Synthetic Rubbers.** P. F. C. Sowter.

594,891. **Ethylene Polymers.** Western Electric Co.

594,926. **Vinyl Cyanide.** E. I. du Pont de Nemours & Co., Inc.

594,938. **Treating Rubber Latex for Decomposing the Proteins therein.** De Centrale Vereeniging tot Beheer van Proefstations voor de Overjarige Cultures in Nederlandsch-Indie and L. N. S. Homans.

594,966. **Articles from Rubber or the Like.** Dewey & Almy Chemical Co.

594,999. **Solutions Including Polymers of Acrylonitrile.** E. I. du Pont de Nemours & Co., Inc.

595,005. **Adhesive Composition.** P. Frankfurther.

595,009. **Rubber Derivatives Useful as Rubber-to-Metal Adhesives.** R. M. Vance and C. A. Damicone.

595,035. **1,3-Butadiene.** British Celanese Ltd. (Celanese Corp. of America).

595,043-054. **Compositions Including Acrylonitrile Polymers and Copolymers and Shaped Articles Produced therefrom.** E. I. du Pont de Nemours & Co., Inc.

595,056. **Complex Esters and Their Polymers.** F. J. Cleveland (Pittsburgh Plate Glass Co.).

595,057. **Coated Polymers.** Pittsburgh Plate Glass Co.

595,058. **Polymerizing Unsaturated Organic Compounds.** Pittsburgh Plate Glass Co.

595,092. **Light-Diffusing Cellulosic Plastics.** Soc. des Usines Chimiques Rhone-Poulenc.

595,119. **Reaction Products of Aldehydes and Diazine Derivatives.** British Thomson-Houston Co., Ltd.

595,120. **Polymerization Process for Olefins, Using a Slow-Acting Catalyst.** C. Arnold (Standard Oil Development Co.).

595,125. **Organo-Siloxanes.** Corning Glass Works.

595,180. **Synthetic Resins.** American Cyanamid Co.

595,208. **Furfuryl Alchol Resinous Products.** Haveg Corp.

595,288. **Cast Resin.** Ges. zur Forderung der Forschung auf dem Gebiete der Technischen Physic an der Eidgenossischen Technischen Hochschule.

595,290. **Adhesive Compositions.** E. I. du Pont de Nemours & Co., Inc.

595,311. **Rubber Articles with Insecticidal Properties.** F. N. Pickett.

595,338. **Phenolformaldehyde Resinous Compositions.** E. H. G. Sargent.

595,366. **Synthetic Resinous Materials.** Resinous Products & Chemical Co.

595,384. **Ethylenediamine and Its Derivatives.** Imperial Chemical Industries, Ltd.

595,447. **Synthetic Resins.** Distillers Co. Ltd., J. J. P. Staudinger, D. Faulkner, and M. D. Cooke.

MACHINERY

United States

2,431,843. **Injection Molding Press.** H. H. Swoger, Pittsburgh, Pa.

2,432,174. **Apparatus to Manufacture Shoes of Solidifiable Plastic Material.** E. Rollmann, Philadelphia, Pa.

2,432,701. **Apparatus for Applying an Elastic Sleeve to a Flexible Metallic Conduit.** P. S. Van Orden, Stirling, assignor to Breeze Corp., Inc., Newark, both in N. J.

2,433,132. **Injection Molding Control Apparatus.** N. Lester, Cleveland Heights, assignor to Lester Engineering Co., Cleveland, both in O.

2,433,654. **Injection Molding Machine.** R. W. Dinzl, Westfield, assignor to Watson-Stillman Co., Roselle, both in N. J.

Dominion of Canada

445,288. **Hydraulic Vertical Pressure Mechanism Adapted to be Operated in Connection with a Hydraulic Brake System.** Wingfoot Corp., assignee of R. H. Vogel, both of Akron, O., U.S.A.

445,290. **Stretch-Wrapping Equipment.** Wingfoot Corp., Akron, O., assignee of J. F. Vincent, Birmingham, Ala., both in the U.S.A.

445,566. **Plastic Extruder.** W. H. Kay, Columbus, O., U.S.A.

445,568. **Tire Building Apparatus.** F. W. Manning, Palo Alto, Calif., U.S.A.

United Kingdom

594,505. **Tire Demounter.** R. Antraigne.

594,660. **Molding Apparatus.** Ford Motor Co., Ltd.

594,829. **Device to Remove Tires from Molds.** Dunlop Rubber Co., Ltd., and L. S. Blanchard.

594,860. **Molding Machine for Plastic Materials.** AC-Sphinx Sparking Plug Co., Ltd., D. H. Corbin and O. W. Dork-Olsen.

594,889. **Extruder for Composite Strips of Rubber.** Wingfoot Corp.

595,335. **Vulcanizer.** A. H. Stevens (Firestone Tire & Rubber Co.).

UNCLASSIFIED

United States

2,431,699-701. **Wheel Trim Ring.** G. A. Lyon, Allenhurst, N. J.

2,431,709. **Tire Chain.** W. R. Royer, Wilkes-Barre, Pa.

2,431,981. **Anti-Skid Device.** C. T. Asbury, Fort Lauderdale, Fla.

2,432,139. **Portable Tire Repair Unit.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.

2,432,232. **Attachment for Tire Chains.** E. B. Eniti and L. A. Nichols, both of Plainfield, Vt.

2,432,329. **Anti-Skid Device for Vehicles.** M. Marthinsen, Michigan City, Ind.

2,432,367. **Device to Detect Leakage of Inflammable or Explosive Fluids.** G. J. C. Andresen, assignor to Wingfoot Corp., both of Akron, O.

2,432,526. **Tire Deflation Indicator.** M. A. Lacey, Oakland, Calif.

2,432,530-531. **Wheel Cover.** G. A. Lyon, Allenhurst, N. J.

2,432,598. **Hose End.** A. J. Weatherhead, Jr., Shaker Heights, assignor to Weatherhead Co., Cleveland, both in O.

2,432,675. **Vehicle Wheel.** J. V. L. Peacock, Columbus, Ga.

2,432,935. **Apparatus for Making Coiled Yarn.** T. J. Rhodes, Ramsey, N. J., assignor to United States Rubber Co., New York.

2,432,993. **Method of Indenting Felt Paper Having the Dried Residue of Latex Distributed throughout Its Thickness.** A. L. Jennings, assignor to Armstrong Cork Co., both of Lancaster, Pa.

2,433,073. **Vehicle Wheel.** W. B. Terry, Houston, Tex.

2,433,113. **Lever Actuated Tire Bead Forcing Device.** J. Graves, Berkeley, and A. N. Butler, assignors to Speedmaster, Ltd., both of Oakland, both in Calif., a copartnership of Graves and Butler.

2,433,119. **Hose Coupling.** F. E. Hansen, Lakewood, O.

2,433,409. **Track and Drive from Dual Tires.** B. Walker, Piedmont, Calif.

2,433,435-436. **Anti-Skid Device.** J. J. Cook, assignor to J. J. Cook Mfg. Corp., both of Detroit, Mich.

2,433,545. **Tire Chain Assembly.** R. Chartier, Lac Masson, P. Q., Canada.

2,433,537. **Photoelectric Apparatus for Measuring the Diameter of an Inflated Flexible Casing.** S. C. Hurley, Jr., Danville, Ill.

2,433,567. **Emergency Truck Tire Chain.** C. G. Lofgren and V. H. Salinas, Denver, Colo.

2,433,605. **Vehicle Wheel.** G. Faulds, Philadelphia, Pa.

Dominion of Canada

445,414. **Producing Gatherings by Means of an Elastic Thread.** O. Haag, Kuesnacht, Canton Zurich, Switzerland.

445,544. **Tire Demounting Equipment.** M. V. Chaiko, assignee of E. & G. Machine Tool Co., copartnership including M. V. Chaiko and W. Polt, both of Freeport, and N. Goris and L. Egoroff, both of Huntington Station, both in N. Y., U.S.A.

445,367. **Drop Center Tire Carrying Rim.** Kelsey-Hayes Wheel Co., assignee of C. W. Sinclair, both of Detroit, Mich., U.S.A.

445,552. **Tire Tool.** J. Graves and A. N. Butler, both of Oakland, Calif., U.S.A.

445,581. **Valve Means for Facilitating the Inflation and Deflation of Pneumatic Envelopes or Bags.** N. Straussler, London, England.

TRADE MARKS

United States

434,631. **Reliance.** Sponges. Faultless Rubber Co., also doing business as Ashland Rubber Works, Ashland, O.

434,632. **Wear Well.** Water resistant wax for rubber. International Chemical Co., Chicago, Ill.

434,635. **Craftspun.** Shower curtains. Scranton Lace Co., Scranton, Pa.

434,648. Representation of a circle containing a crow standing on a globe and the words: **"Best British Manufacture."** Synthetic resin laminated sheets and insulation. Attwater & Sons, Ltd., Preston, England.

434,659. **Hy-Fly.** Silicone waterproofing composition. Scientific Anglers, assignor to Scientific Anglers, Inc., both of Midland, Mich.

434,660. **Hy-Line.** Fishing line waterproofing. Scientific Anglers, assignor to Scientific Anglers, Inc., both of Midland, Mich.

434,663. **Sovac.** Rubber floor wax. Socony-Vacuum Oil Co., Inc., New York, N. Y.

434,670. Representation of a sea-horse using a swim support. Swim supports. Ayvad Water-Wings, Inc., Union City, N. J.

434,688. **Little Tot.** Toy rubber stamp set. E. A. Lallemand & Son, Nashville, Tenn.

434,698. **Restemp.** Electrically heated bedwarming pads. Crise Mfg. Co., Columbus, O.

434,701. **Ohopex.** Plasticizers. Ohio-Apex Inc., Nitro, W. Va.

434,733. **Advan.** Accelerator. Advance Solvents & Chemical Corp., New York, N. Y.

434,737. **Fielderest.** Electrically heated blankets. Marshall Field & Co., Chicago, Ill.

434,757. **Letherlyke.** Industrial arts plastic sheets. F. D. Mayer, doing business as Reyam Plastic Products Co., Chicago, Ill.

434,824. Representation of a shield containing a caduceus and the word: **"Ortho."** Vaginal diaphragms and applicators. Ortho Pharmaceutical Corp., Linden, N. J.

434,825. **Splendor.** Surgical bandages, arch, metatarsal, and ankle supports, etc. Splendor Ltd., Nottingham, England.

434,828. **Catapak.** Phenol and formaldehyde molding powder. Catalin Corp., New York, N. Y., assignor to Catalin Corp., of America, a corporation of Del.

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	December, 1947
15° & 16° D. C. Passenger	
15x4.00E	40,497
16x4.00E	452,634
16x4.50E	188,120
15x5.00E	109,472
16x5.00E	15,269
16x5.00F	36,734
15x5.50F	102,215
16x5.50F	8,125
16x6.00F	6,237
16x4.00E—Hump	161,098
16x4.50E—Hump	7,265
15x5.00F—Hump	3,167
15x4½-K—Hump	71,685
15x5-K—Hump	118,731
15x5½-K—Hump	72,519
15x6-L—Hump	16,203
15x4½-K	27,465
16x4½-K	10,446
15x5-K	180,754
16x5-K	162,663
15x5½-K	461
16x5½-K	17,444
15x6-L	29,547
16x6-L	74,100
15x6½-L	51,209
17° & Over Passenger	
18x2.15B	786
19x2.15B	2,857
Flat Base Truck	
17x4.33R	7,711
20x4.33R	16,195
17x5.0	24,403
18x5.0	12,112
20x5.0	51,210
15x5.00S	844
18x5.00S	495
20x5.00S	55,787
17x5.5	3,097
20x5.50S	25,186
17x6.0	1,788
20x6.0	200,243
20x6.00S	60,013
15x6.00T	1,399
20x6.00T	13,345
20x6.5	11,769
15x6.50T	858
20x6.50T	21,720
20x7.0	3,168
20x7.33V	29,886
22x7.33V	8,988
24x7.33V	668
20x7.5	14,239
20x7.50V	6,420
22x7.50V	393
20x8.0	486
22x8.0	822
20x8.00V	6,441
22x8.00V	1,743
19x8.37V	1,496
20x8.37V	653
24x8.37V	2,054
19x9.00V	114
20x9.00V	62
24x9.00V	131
Semi D. C. Truck	
16x4.50E	4,777
20x4.50E	294
15x5.50F	31,591
16x5.50F	20,270
16x6.00G	8,402
Tractor & Implement	
12x2.50C	3,425
12x3.00D	32,828
15x3.00D	26,365
16x3.00D	9,293
18x3.00D	12,821
19x3.00D	16,246
21x3.00D	8,613
30x3.00D	215
36x3.00D	1,357
15x3.75JA	3,031
16x4.25KA	4,701
20x4.50E	10,700
22x4.50E	365
18x5.50F	11,083
24x5.50F	2,972
24x8.00T	7,564
28x8.00T	2,507
32x8.00T	1,455
W5-24	1,900
W7-24	1,130
W8-24	5,848
W8-32	957
W8-36	329
W9-24	970
W9-28	2,926
W9-36	1,969
W9-38	7,221
W10-28	5,181
W10-38	1,007
W11-28	689
W11-38	2,382
DW8-42	970
DW9-38	10,390
DW10-38	9,066
DW10-42	1,615
DW11-26	1,880
DW11-28	1,996
DW11-38	3,462
DW12-26	2,368
DW12-30	3,173
DW12-34	254
DW14-30	2,294
DW14-34	812
DW16-26	360
Earth Mover	
20x11.25	117
24x13.00	103
24x15.00	80
25x17.00	2
29x17.00	193
33x22.00	91
Total	2,846,052

OBITUARY

W. J. Woodcock

W. J. WOODCOCK, director of John Bull Rubber Co., Ltd., Evington Valley Mills, Leicester, England, died January 1. He would have been 50 on January 8. He was a native of Birmingham.

After Navy service in the first World War the deceased joined Dunlop Rubber Co., Ltd., in Birmingham and was transferred to Manchester as personal assistant to the managing director of the Mackintosh Factory. About 1929 he left to join the John Bull company, of which he became a director in 1946.

A member of the National Joint Industrial Council of the Rubber Industry, his work on the Council brought about the 45-hour work week. For the last year he had been giving support to the John Bull Works Council of which he was the chairman. During his business career he visited the United States and the Far East many times.

Surviving Mr. Woodcock are his wife, a son, and a daughter.

Jesse Mercer White

THE president, treasurer, and general manager of J. M. White, Inc., Philadelphia, Pa., Jesse Mercer White, died on January 9 at his home in Merion, Pa., at the age of 64. Born in Live Oak, Fla., Mr. White came to Philadelphia in 1902. Prior to that time he had acquired a reputation in Florida as a bicycle man and bicycle racer. He accumulated experience in motor car agencies which led to his many inventions for the automotive industry. In 1912 he founded J. M. White, Inc., to manufacture electric cable and various electrical connecting facilities for use on motor cars and appliances. The business will be continued without change or interruption.

Albert J. Kayser

ALBERT JULIUS KAYSER, head of original equipment sales to manufacturers in the shoe products division of the Goodyear Tire & Rubber Co., Akron, O., died on December 28 in Akron after a two-week illness. Mr. Kayser was born in Dardanelle, Ark., on December 3, 1892. For two years he attended the University of Missouri. He had been graduated from Joplin, Mo., high school.

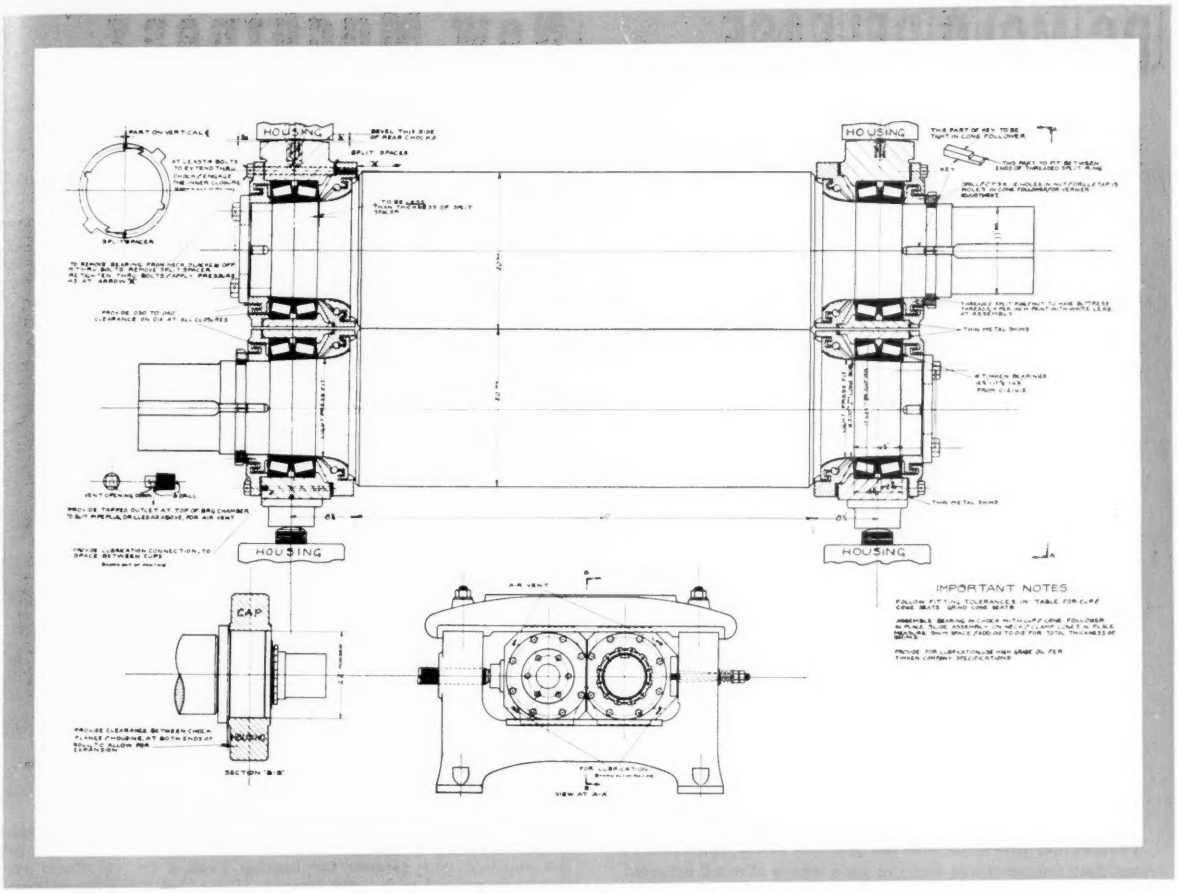
He joined the Goodyear company at Kansas City on October 1, 1919, starting in the shoe products sales department. He remained there until May, 1931, when he was transferred to Milwaukee and put in charge of sole and heel sales to manufacturers. He was named head of all original equipment sales to manufacturers in September, 1936.

Mr. Kayser was a member of the Presbyterian Church in Missouri and Joppa Lodge, F. & A. M. in Minneapolis.

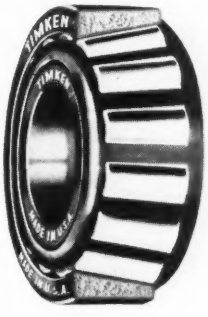
Funeral services were held on December 31 in Cuyahoga Falls, O. Cremation took place at the Cleveland Highland Park Crematory.

Surviving are the widow, a son, a daughter, a grandson, a brother, and a sister.

(Other obituaries are on page 682)



How To Improve Rubber Mill Performance and Reduce Maintenance



Everything else being equal, rubber mills equipped with Timken Balanced Proportion Roller Bearings perform better, possess greater availability for service, last longer, cost less for operation and maintenance.

Mills have greater rigidity because Balanced Proportion bearings make possible larger roll neck diameters with 50% to 60% increased neck strength. Load ratings are higher, too — up to 40% higher than previous designs of tapered roller bearings, size for size.

A typical example of the application of Timken Balanced Proportion Bearings to rubber mill roll necks is shown in the drawing. There is a standardized application ready for your new or existing mills. Consult the mill builder or our engineers. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⓡ AND THRUST ⓣ LOADS OR ANY COMBINATION ⓡⓣ

DC MOLD RELEASE EMULSION NO. 35

increases efficiency in molding mechanical rubber goods

PHOTO COURTESY BALDWIN RUBBER CO.

Automotive grommets of synthetic rubber are easily unloaded in a single sheet from 121 cavity mold lubricated with DC Mold Release Emulsion No. 35.

When the production manager and the press operator agree on the merits of a mold lubricant it's good news in the rubber industry. Ordinary mold lubricants which give easy release and win favor with the operator break down fast at molding temperatures and run up a whale of a bill for mold maintenance. But DC Mold Release Emulsion No. 35 is not an ordinary mold lubricant. It's one of those remarkably heat-stable Dow Corning Silicone Products. Chemically related to glass and quartz, this DC Silicone mold lubricant gives easy, clean release and still keeps molds cleaner for a much longer time than any other release agent.

You will note in the picture above, the clean, bright finish which results from rapid flow into a clean cavity. That means more salable rubber goods.

You will note also that this sheet of 121 automotive grommets unloads easily. That saves change time and speeds up the molding cycle, lessens the danger of tearing molded parts, simplifies the job of trimming and finishing.

DC Mold Release Emulsion No. 35 is clean, efficient, and pleasant to use. It is effective in very low concentrations and can be applied rapidly. In many molding jobs, only a few applications are required per day. You can't beat that combination of clean and easy release, high surface finish and clean molds that stay clean.

DOW CORNING CORPORATION, MIDLAND, MICHIGAN

Chicago: 228 N. LaSalle Street • Cleveland: Terminal Tower
Los Angeles: 634 S. Spring St. • New York: Empire State Building
Canada: Fiberglas Canada, Ltd., Toronto • England: Albright and Wilson, Ltd., London

FOR MORE INFORMATION ABOUT DC MOLD RELEASE EMULSION NO. 35, PHONE OUR NEAREST BRANCH OFFICE OR WRITE FOR LEAFLET NO. U 5-3.

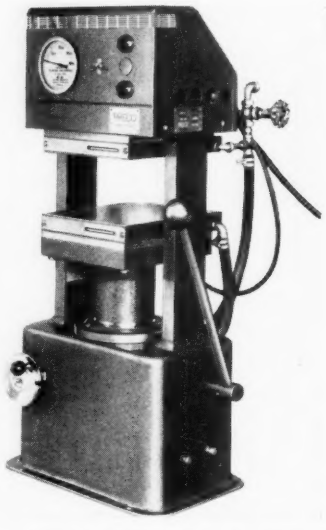
ow orning

FIRST IN SILICONES

New Machines and Appliances

Hydraulic Press

ANY operation that requires pressure up to 20 tons, and that may also require heat, can be rapidly performed on the new PA7 Preco hydraulic press, according to its maker, Preco, Inc., 1102 Architects Bldg., Los Angeles 13, Calif. The press is a bench-type unit standing only 32 inches high. The built-in two-stage hydraulic hand pump incorporates a high-speed stroke for quick platen closure which converts semi-automatically to a high-pressure stroke for easily producing the maximum force of 40,000 pounds.



New PA7 Preco Hydraulic Press

The extreme flexibility of the press makes it ideal for many types of work. It may be used individually or in batteries with the hand pump or connected to a central hydraulic system. Highly accurate, electrically heated, water-cooled platens are standard equipment, but the press can be supplied with platens for heating from a central steam system or equipped with solid platens. For added flexibility in operation, a third platen is installed between the two standard platens to double the capacity of the press.

Platen sizes of eight by eight inches and 8¾ by 12 inches are available. Platens open up to eight inches and maintain alinement and even pressure over their entire surfaces without adjustment. Numerous modifications of the press are available for adaptation to a wide range of applications.

New Steam Boiler

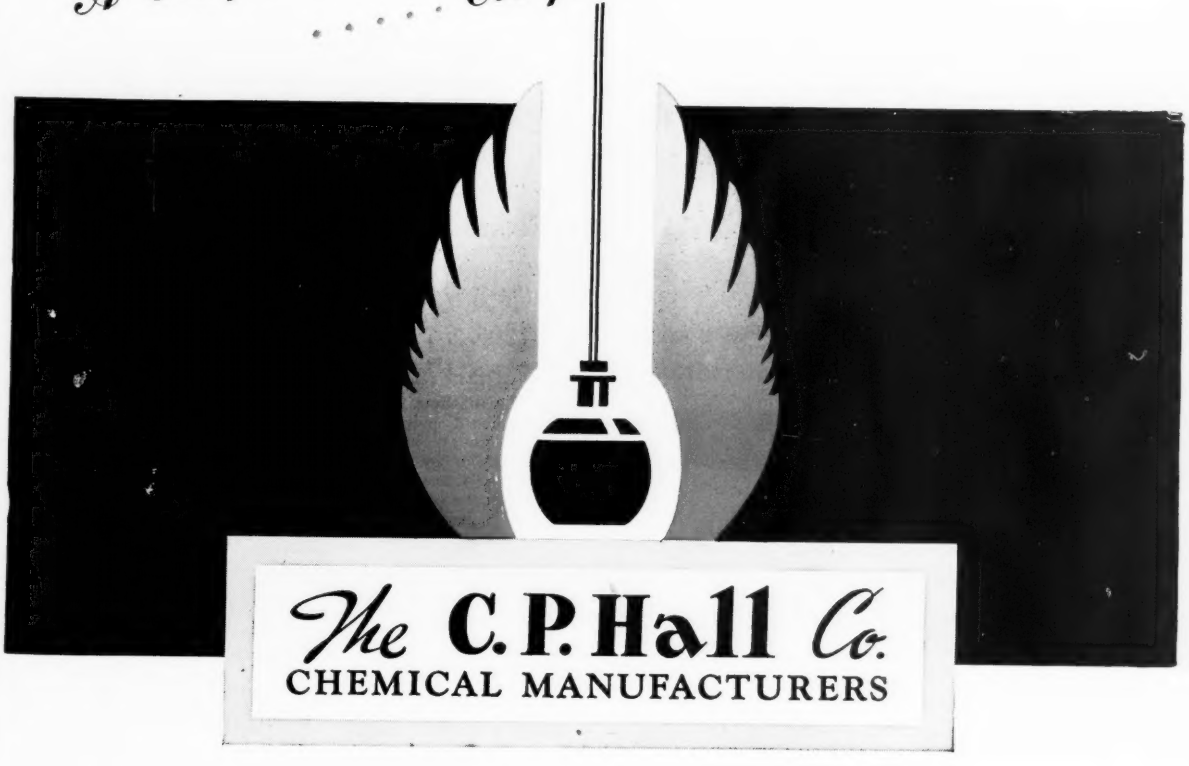
A NEW 150-h.p., gas-fired, multiple jet, blast oil burner type of steam boiler is said to incorporate the best of big steam generating plant design in a water tube industrial boiler, with

FOR HIGH ABRASION FURNACE ... PHILBLACK O

FOR FURTHER DETAILS, SEE AD ON PAGE 560

Accelerators
Plasticizers
Antioxidants

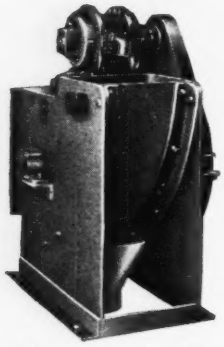
A Complete Line of Approved Compounding Materials



The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL. • SAN FRANCISCO, CALIF.

For HIGH SPEED CRUSHING of DRY ICE with MINIMUM SHRINKAGE



AMERICAN
Pick & Roll
CRUSHER

Crushes 10″ x 10″ blocks to usable chip sizes in 15 seconds. This rapid reduction minimizes shrinkage loss and reduces handling of dry ice. A compact, self-contained unit.

Pick-and-roll action with heavy cast rotor with renewable heat-treated alloy steel picks. Anti-friction type bearings. Sturdy plate steel, welded construction. Positive roller-chain drive enclosed in oil type housing. Heavy adjustable steel platen.

Send for literature and specifications

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Originators and Manufacturers of Ring Crushers and Pulverizers
1535 Macklind Ave.
St. Louis 10, Mo.

Charles T. Wilson Co., Inc.

120 WALL ST., NEW YORK 5, N. Y.

★

Plantation and Wild Rubbers
Synthetic Rubbers
Liquid Latex
Balatas, Guayule, Gums

★

Distributor of
GR-S Synthetic Latices
By Appointment of Office of Rubber Reserve

BRANCHES AND SALES REPRESENTATIVES
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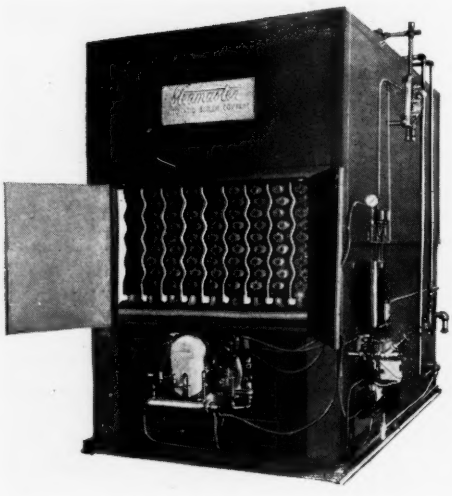
Ernest Jacoby & Co., 79 Milk St., Boston, Mass.
Reinke & Amende, Inc., 1925 East Olympic Blvd., Los Angeles, Cal.
Charles T. Wilson Company (Canada) Ltd., 406 Royal Bank Building, Toronto, Canada



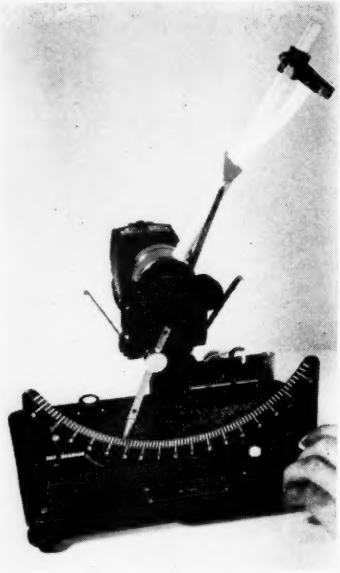
Steamaster 150 H.P. Oil Burning Steam Boiler

resultant increased efficiency and safety. The manufacturer, Steamaster Boiler Co., claims it to be the only boiler of its size which has the following "big time" design features: water tube principle, sectional headers, longitudinal drum, and inclined tubes.

Steamaster's line of boilers from 60 h.p. and up now offers a choice of burner arrangements, allowing the user to burn oil, gas, coal, or any combination of these fuels.

Stiffness Tester

A NEW motor-driven stiffness tester, designed for rapid, consistent, and accurate testing of rubber and rubber products, has been developed by W. & L. E. Gurley. The testing device measures the stiffness of practically any thin, flexible material, and its capacity is from light tissue paper or thin cloth up to hard rubber and the heaviest type of single-sheet box boards.



Motor-Driven Gurley Stiffness Testing Device

More convenient than hand-operated instruments, the machine has a balanced pointer which pivots on jewel bearings and moves parallel to a sine scale mounted on the base. It is located below the center with weights of 5, 25, 50, or 200 grams, fastened one inch, two or four inches from the pivots. The arm carrying the test specimen is moved by a small, geared synchronous motor which is controlled by a reversing switch that is located on the base.

To make a test, a specimen is first cut to a standard width and length, fastened in a movable clamp so that the free end overlaps the top of the pointer by ¼-inch, and pressed against the top of the pointer until it is bent sufficient to assume a short arc. The pointer is then automatically released. The greatest reading of the pointer against the sine scale is averaged in both directions, to eliminate any effects of curl, and may be multiplied by a factor applying to one of 144 combinations of specimen and loading weight. The product is expressed as the stiffness of the specimen.

Complete details on the tester are given in the company's bulletin, No. 1440.

When the once-familiar cry of "Any ice today?" heralded the ice wagon's arrival, some 50 years ago... studies and experiments in the development of light fraction petroleum refining were already begun at Standard Oil.

From this work came the many Esso Solvents that today serve the most exacting needs of the paint, rubber, textile, refrigeration and other industries.

The gleaming enamel finish of the modern refrigerator, its pliable rubber trays, its silent ice-making machinery, are just some of the parts where Esso Solvents can be used.

Whatever your manufacturing process...whatever your solvents requirements... you can be sure that Esso Solvents and our staff of technical experts can help you solve your problem. Call or write our office nearest you.

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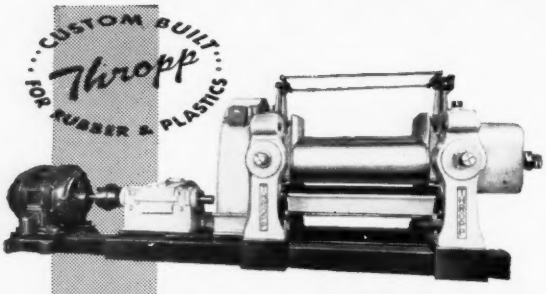
STANDARD OIL COMPANY OF PENNSYLVANIA—Philadelphia, Pa.



New Hi-Speed MILLS

22" & 22"x60" Extra Heavy Duty

Extra Heavy Duty Individual Motor Driven Mill with 15" diameter journals, having 150 H.P. enclosed herringbone gear drive. Machine is equipped with solid bronze lined bearings having oil closure seals on side of the boxes facing the rolls to prevent oil contamination of the stock. Steel cut connecting gears and Johnson Rotary Joints. Manzel mechanical lubricator and new style guides bored to fit the rolls. This is just one of the many new Thropp precision built mills designed to speed up post war production.

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Los Angeles, Cal.

Thropp

WM. R. THROPP & SONS CO.
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MEMBERS—Rubber Trade Assn. of N. Y. Inc.—
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EUROPE

GREAT BRITAIN

Rubber Goods Exports

A comparison of prewar exports of rubber goods by the United Kingdom with data for postwar business reveals that the British rubber industry had already in 1946 greatly exceeded its prewar level in *value* of exports, but available figures for the first ten months of 1947 indicate that in that period there was still a lag in the actual quantity of exports of a few lines, including pneumatic tires for motor vehicles. The following table based on statistics compiled by *The India Rubber Journal* from Board of Trade data indicates the trend of exports by *quantity*:

	Monthly Average		
Tires for:	1938	First Half, 1947	July-Oct., 1947
Motor cycles and tricars ..... *no.*	3,800	5,420	5,650
Other motor vehicles..... *no.*	102,064	86,298	78,200
Cycles..... *no.*	172,274	148,858	187,750
Tubes for motor cycles, tricars, and other motor vehicles..... *no.*	148,227	153,055	219,000
Sheets and sheetings, wholly of rubber.....*cwt.*	1,195	2,608	950
Rubber thread wholly of rubber *cwt.*	632	933	1,094
Tubing and hose.....*cwt.*	2,988	4,696	5,500
Elastic cords, webs, fabrics, etc. *lbs.*	48,695	95,323	109,500
Hot water bags..... *doz.*	1,664	6,160	9,475
Hard rubber.....*cwt.*	112	893	865
Belting: rubber and canvas.... *tons*	140	99	122
All other..... *tons*	153	277	294
Footwear: Men's, with soles of rubber composition....*doz. prs.*	995	1,701	1,827
Made wholly or partly of rubber, balata, or gutta percha *doz. prs.*	5,375	9,832	9,640
Mackintoshes and the like, rubber-proofed..... *no.*	47,850	54,833	31,800
All other..... *no.*	21,758	279,600	124,413
Golf and tennis balls.....*doz.*	57,604	30,991	30,301

The average monthly exports of all kinds of tires and tubes had a value of £274,311 in 1938, £735,690 in the first half of 1947, and £607,400 in the four-month period, July-October, 1947. The average monthly exports of all other rubber manufactures had a value of £280,569 in 1938, £977,211 in the first half of 1947, and of more than £1,000,000 in the four-month period, July-October, 1947.

The export targets at which the British rubber industry has been asked to aim are £1,200,000 a month, by the middle of 1948, and £1,400,000 by the end of the year, for tires; and £1,000,000 and £1,250,000 a month, respectively, for all other manufactures of rubber, if the prices are on the level of those prevailing in the last quarter of 1946. Judging by the above figures, there should not be much difficulty in attaining the quotas for general rubber manufactures, but the quotas for tires will not be easy to fill.

Rubberproofed Garment Industry

The Working Party on Rubber Proofed Clothing has issued a report embodying various recommendations calculated to strengthen this section of the heavy clothing industry and to enable it to meet competition on home and foreign markets. It was urged that greater attention be paid to layout and factory organization and the possibility of improving equipment should be investigated. Other recommendations included greater interest in research, establishing minimum standards of quality, elimination of seasonal fluctuation, adequate training of new entrants and of supervisors and executives, development of markets by a central organization, and the establishment of a design and exhibition center. It was also suggested that trade organizations consider the desirability of having a single employers' organization and a single employes' organization for rubberproofed clothing manufacture and further that a council for the clothing industry should be formed with direct representation of the rubberproofed clothing interest.

Rubberproofed garments are produced by 200-300 firms employing a total of about 6,000 workers; small firms predominate. Out of 115 firms in the Manchester and Salford region registered as waterproof manufacturers, 51 have fewer than 20 workers and only 24 have more than 100. Most firms make

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RECIPE

(Test No. 8348 from the Barrett Rubber Research Laboratory)

GR-S : NATURAL RUBBER BLEND

With a Shore A Hardness of 75 for Black Molded and Extruded Goods

This recipe employs GR-S and natural rubber in a 50:50 blend. The compound has excellent processibility, and the vulcanizates have good physical properties. It can be readily extruded or molded, and yields quality products at a low cost.

GR-S: NATURAL RUBBER BLEND BLACK MOLDED AND EXTRUDED COMPOUND

Test No. 8348

RECIPE	WEIGHT BASIS
GR-S Standard	50.00
Smoked Sheets	50.00
CUMAR* Resin, RH grade	15.00
Furnace Black (HMF)	25.00
Clay (Hard)	50.00
Calcium Carbonate (Precipitated)	75.00
Stearic Acid	2.00
"Sunproof"	2.00
Zinc Oxide	5.00
"Aminox"	0.25
Sulfur	3.50
Benzothiazyl Disulfide	1.20
Diorthotolylguanidine	0.30
TOTAL	**279.25**
Mooney Viscosity (Large Rotor) 4 minutes at 212° F	35
Specific Gravity	1.46
Rubber Hydrocarbon, % by wt.	35.8
Rubber Hydrocarbon, % by vol.	56.8

Scorch Test Data: Mooney Viscometer (Small Rotor) at 250° F

Minutes	Viscosity
1	19
5	18
10	17
15	17
20	19

Cure at 316° F (70 lb.)—10 minutes

Tension and Hardness Data:	Unaged	Aged 7 Days at 70° C	Aged 24 hrs. at 100° C
Stress—psi. 300%	1150	1550	—
Tensile—psi.	1800	1800	1400
Elongation—%	430	360	280
Hardness—Shore A	74	80	79
Tear Resistance (Angle) (Pounds Per 1.0 Inch Thickness)	120	100	85
† **Crack-Growth Resistance (DeMattia)** (Kilocycles Per 0.5 Inch Crack-Growth)	16.3	12.0	4.7
† **Compression Set**—% (40% Constant Deflection)	34.9	—	—
† **Resilience (Yerzley Oscillograph)**—%	70.0	66.6	66.3
† **Impact Resilience (Goodyear-Healey Resiliometer)**—% (15° Angle at Room Temperature)	53.9	55.9	55.4

† Specimens cured 15 minutes at 316° F (70 lb.)

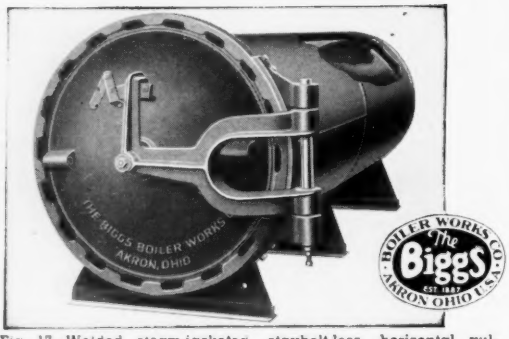

Fig. 17. Welded steam-jacketed, staybolt-less, horizontal vulcanizer with quick-opening door. All sizes; various working pressures. Low maintenance.

***BIGGS Vulcanizers* are Standard Equipment in the Rubber Industry**

Biggs-built vulcanizers and devulcanizers have always had a prominent place in the development of the rubber industry. For over 45 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers. Biggs modern all-welded units with quick-opening doors are available in all sizes and for various working pressures with many special features.

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904 Fisher Bldg.
Detroit 2, Mich.

chemically-proofed rainwear in addition to the rubberized garments; while a fair number also include the production of light oilskins and even of unproofed outerwear.

A History of Rubber

The Institution of the Rubber Industry is supporting a plan to produce an authoritative book on the history of the rubber industry. It seems that Mr. Fordyce Jones in 1946 suggested such a history and soon obtained enough suppport to gain the approval of the council of the Institute. A general plan has been worked out under the joint editorship of Mr. Fordyce Jones, D. F. Twiss, and T. R. Dawson, and the services of a distinguished group of rubber experts have been secured to contribute the various chapters.

According to details of the plan, the work is to be divided into six sections. The first will discuss the origin of the industry and will include a historical outline going back to the Aztec picture writings and progressing to the manufacturing activities and chief companies in Great Britain, the United States, France, and Germany, up to 1900 A.D.

In the second section raw materials of the industry will be dealt with. Scientific and technological development will be treated in section three, and the various products and rubber in the 1939-45 war in section four. Economic and social history, the subject of section five, will include a statistical outline of rubber products and trade, the story of raw rubber markets and of manufacturers' exhibitions, labor, and institutions and associations, other than research. The final section is reserved for bibliography.

It is emphasized that all the chapters relate to pure story—there is to be only as much technical and scientific information as is needed to separate the various ideas involved. In other words, the book is to be essentially about men and events. The editors are requesting the loan of suitable historical archives, notes, and personal memoranda.

British Rubber Industry Notes

A Kenward Memorial Trust has been formed by a group of leading British industrialists for the foundation and endowment of a Research Fellowship on Industrial Administration at Cambridge University as a memorial to the late Sir Harold Kenward. The trustees are Sir Miles Thomas, Sir George Beharrell, Sir Reginald Rootes, C. E. Wallis, and K. C. Johnson-Davies. Sir Harold Kenward was a director of the Dunlop organization and died suddenly while on a business trip to the United States.

John Cobb, British automobile racer, recently broke his own record when he attained a speed of 415 miles an hour, thus setting up a new world record. His tires were designed and made for him by Dunlop Rubber Co., Ltd.

Malayan Rubber Estates Owners Co., formed after the war to aid in the rehabilitation of the plantations in Malaya, is to be wound up.

A. S. Bishop, a director of Goodyear Tire & Rubber Co. (Great Britain) Ltd., has been unanimously elected chairman of the Tire Trade Joint Committee to succeed the late Sir Harold Kenward. Represented on the committee are the Motor Agents' Association, the Motor Factors' Association, The National Tire Distributors' Association, the Scottish Motor Trade Association, the Society of Motor Manufacturers & Traders, Ltd., and the Tire Manufacturers' Conference, Ltd.

The Goodyear Tire & Rubber Co. (Great Britain), Ltd., recently celebrated the 20th anniversary of the opening of its Wolverhampton factory. Goodyear's British factory had first been in London, but the growth of the business led to the move to Wolverhampton, where the present plant was opened in 1927.

British Geon, Ltd., has increased its original capital of £500,000 by an additional £500,000 in 200,000 ordinary and 300,000 unclassified shares of £1 each. To July, 1947, Distillers Co., Ltd., held 151,251 ordinary and 123,750 preference shares, and The B. F. Goodrich Co. held 123,749 ordinary and 101,250 preference shares out of 275,000 ordinary and 225,000 preference shares issued.

In December the British Post Office laid a submarine cable between Aldeburgh, Suffolk, and Domburg, on the island of Walcheren, Holland. The cable, designed and produced by Submarine Cables, Ltd., is of a new coaxial type and is said to be the first of its kind in the world to be laid for commercial purposes. The cable will provide 84 telephone circuits from England to Holland and, in a year, to all the Scandinavian countries.

G. E. Beharrell, managing director of Dunlop Rubber Co., Ltd., is the new president of the Tire Manufacturers' Conference.

Where non-migratability counts

Coaxial cable furnished by Federal Telephone and Radio Corporation

–plasticize your vinyl compounds with Paraplex G-25

When unvarying quality and permanence are essential in your vinyl compounds, count on PARAPLEX G-25!

A typical instance: in coaxial cable produced by Federal Telephone and Radio Corporation, PARAPLEX G-25 is used because this resinous plasticizer is non-migrating. This property prevents contamination of the insulation, which would affect the properties of these highly specialized cables.

Other advantages of PARAPLEX G-25 are excellent ultra-violet resistance, high-temperature stability, low flammability and ease of processing, particularly on stocks, both extruded and calendered, where a high finish is desired.

If you are working with vinyl compounds, you'll want to know more about PARAPLEX G-25 . . . and about the MONOPLEX group of ester plasticizers.

Complete information will be sent to you upon request.

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59 plants located in 27 states give Eagle-Picher's activities a national scope. Strategic location of plants and extensive production facilities enable Eagle-Picher to serve industry with increased efficiency... we manufacture a comprehensive line of both lead and zinc pigments for the rubber, paint and other process industries.

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Decisions set forth in the White Paper on capital investment in 1948 amount to a temporary ban of at least six months on the erection of new industrial buildings or extensions except in the case of a limited number of such undertakings as will make an early and significant contribution to exports or import savings or are needed in basic industries.

FRANCE

Most of the commodities important in the United States export trade with France are expected to benefit from the concessions made by that country under the General Agreement on Tariffs and Trade concluded by the United States and 22 other countries at Geneva, Switzerland, October 30, 1947. Details concerning the French concessions, published in *Foreign Commerce Weekly*, reveal that rates varying with the degree of manufacture were obtained on rubber products. Uncovered rubber thread, which had been partly free and partly dutiable under the former tariff, is subject to 5%, instead of 15% as had been proposed for the new tariff. The new duty on miscellaneous rubber articles was to have been 25%, but was brought to 14%, the approximate equivalent of the 1936-38 specific duties, and on elastic fabrics and articles was reduced almost 30% from the proposed new rate. Synthetic rubber is duty free, though the new tariff would have imposed a duty of 25%. Reductions from the proposed tariff were also obtained on rubber tires and tubes, covered rubber thread, and druggists' rubber sundries.

There is a moderate increase in the rate of duty on artificial leather with a base of rubber, coupled, however, with the inclusion at the same rate of artificial leather with a plastic base, which had not entered the trade before the war. The agreement, as far as the United States, France, and certain other countries are concerned, is effective January 1, 1948. It is not expected that the full effect of the concessions will in all cases be felt in the very near future since France, though it has abandoned its prewar quota system, must control its imports on a selective basis for some time to come because of a critical shortage of foreign exchange.

The Paris Trade Fair of 1948 will be held from May 1-17 at the Parc des Expositions, Porte de Versailles, Paris, XV.

In a recent issue of *Revue Générale du Caoutchouc* attention is called to a new and unusual use for *Hevea* latex which has been revealed in a publication of the Academie de Sciences—in vaccinotherapy. It seems that Henri Jacotot has shown that the addition of a small proportion of *Hevea* latex to vaccines renders the latter three or four times more efficacious. In the course of his investigations on vaccines against rabies, hog cholera, bovine pasteurellosis, and symptomatic anthrax, M. Jacotot observed that in every case where guinea pigs or young pigs had received vaccines in which latex had been incorporated, the proportion of animals resisting inoculation with one of the above diseases was much higher than in those who received the usual vaccine without latex. It was found that the latex is most effective when it is in a state of preflocculation, which is induced with the aid of sodium borate.

[1] Aug., 1947, p. 303.

FINLAND

Finland has an excellent and keenly scientific minded Technical Institute, Teknillinen Korkeakoulu. During the war its library was bombed and totally destroyed.

Dr. Martti Levon, director of the Institute, revealed to Arthur E. Morgan, a member of the American Friends Service Committee, Yellow Springs, O., on the latter's recent visit to Finland, that gifts of scientific and technical books and periodicals from America would be welcome, as replacements for those that had been destroyed. In the remarkable efforts for recovery that the Finns are making, the lack of technical library facilities is a very serious handicap, and it would be a practical act of friendship to a nation that holds America in high regard if Americans should contribute good technical books and periodicals to this library.

Any such gifts should be marked for the Institute of Technology, Helsinki, and sent to the Legation of Finland, 2144 Wyoming Ave., N.W., Washington, D. C. Dr. K. T. Jutila, the Finnish Minister, will arrange for their being shipped to Finland.

GERMANY

During the first nine months of 1947 the combined Anglo-American zones received 45,000 pneumatic tires, the United Kingdom supplying 8,000 and the United States the rest. At the same time 22,000 tons of rubber in addition to substantial quantities of textile were imported into the combined zones for the manufacture of tires. Further supplies of rubber and textiles are to be imported to increase the output of truck tires, of which there is a great shortage. Monthly capacity of the plants in these zones is put at 80,000 tires, but actual outputs have been only about 40,000 tires a month. Natural rubber is now going to Germany because it has been found cheaper than locally produced synthetic rubber.

FAR EAST

MALAYA

Record Rubber Output Reached

Production of rubber in Malaya, which had reached a peak of 58,782 long tons in March, 1947, established a new all-time record in October, 1947, with 64,922 long tons. This figure was due to the steady increase in production of estates of 100 acres and over, which progressed with minor fluctuations going from 27,552 tons in March, 1947, to a high for the year of 33,366 tons in July, back to 32,070 tons in September, and up to 33,078 tons again in October; and a sudden spurt in the outputs of small holdings, which, after dropping steeply from the high of 31,230 tons in March and increasing slightly again to 21,412 tons in September, rose to 31,844 tons in October.

The estate outputs in October included 3,315 tons of prepared latex, of which 611 tons were preserved field latex, 1,923 tons centrifuge concentrate 625 tons cream concentrate, 16 tons other concentrates, and 140 tons Revertex.

Total production of rubber for the first 10 months of 1947 came to 532,087 long tons, against about 495,800 long tons in the corresponding period of 1941.

Other highs in October were the gross exports of rubber from Singapore and the Malayan Union, amounting to 96,584 long tons, (including 2,921 tons of latex) and the exports to the United States of 52,519 tons and to Russia of 13,270 tons. The total gross exports from Singapore and the Malayan Union for the first ten months of 1947 amounted to 774,914 long tons, of which 47.2%, or 365,694 long tons, (including 9,307 tons of latex) went to the United States, 131,094 tons to the United

. . . 2000 lbs. tensile strength minimum
. . . dry, non-tacky film
. . . no adding of vulcanizing agents . . . no heat treatment necessary other than drying

PROPERTIES

1. Dried film tensile strength...2000 lbs. per sq. in. minimum
2. Dried film ultimate elongation. 700% to 800%
3. Viscosity .....Thin
4. Specific gravity 1.025
5. pH Value .....9.3 to 9.8
6. Solids content .....53% ± 0.5

APPLICATION

1. Back coating of rugs and fabrics to impart non-slip and fibre binding characteristics.
2. Coating and impregnating of fabric, paper and wadding for strength, water resistance, and base for further coating.
3. Preparation of molds utilizing properties of flexibility and freedom from further heat treatments.
4. Dipped goods where deposition of film is complete on drying.
5. Adhesive for paper, fabric and leather where bond is improved by film deposit of cured Buna S.
6. As an additive to natural latex, as well as to buna and neoprene, for extension and modification.

Write for detailed data sheet.

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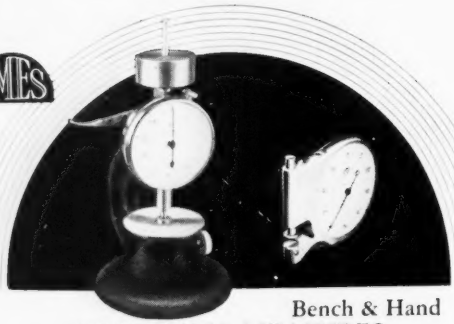

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THICKNESS MEASURES

DIAL COMPARATOR NO. 2: For use at your desk or in fine inspection. Accurately gauges rubber, paper, cloth and other materials where contact areas and pressures to A. S. T. M., T. A. P. P. I., and other specifications are required. Small, light (2¾ lbs.) but very stable. Contact diameters as desired. With or without spindle dead weights. Dial graduated in thousandths, half-thousandths, and ten thousandths.

POCKET THICKNESS MEASURE NO. 25: A precision, pocket-watch-size dial gauge for accurate, speedy, *impersonal* measuring in thousandths of the inch. Ideal for paper, rubber, cloth, printing and metal fabricating industries. For information write to: 59 Ames Street, Waltham 54, Mass.

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ORIGINAL PRODUCERS OF
MAGNESIUM SALTS FROM SEA WATER

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Kingdom, and 29,249 tons to Russia. The gross exports for the ten months including imports from nearby rubber centers totaled 262,596 long tons, of which 71.5% or 187,863 tons were sent by Netherlands India.

Production Costs on Malayan Estates

In the first half of 1947 there was a differential of more than 28 Straits cents a pound in the cost of producing rubber on the most expensive estates as compared with the cheapest. Figures compiled by the Malayan Rubber Advisory Committee, based on data supplied by 50 estates in different parts of the peninsula, indicate that the costs range from 17.21 to 45.67 Straits cents a pound, with an overall average of 28.19 cents per pound. It is considered that the labor situation and the shortage of rice are largely responsible for this wide divergence in costs and that it will tend to be reduced as conditions in labor and rice become more normal.

New Latex Firm Organized

Boustex is the name of a new company in Malaya formed by Boustead & Co. to concentrate latex. The latex is to be bought from estates and will be concentrated by a creaming process at a newly erected factory at Kajang. The creamed latex will be shipped from Port Swettenham, where storage tanks have been installed to handle bulk shipments. Sales in London will be dealt with by Boustead & Co., and in New York, by H. A. Astlett & Co.

INDO-CHINA

During the first half of 1947, Indo China produced 14,045 metric tons of rubber. Detailed figures disclose that after a sharp decline in February outputs increased steadily month by month until in June they were 3,470 tons; in that month 43,000 hectares were tapped, against 20,200 hectares in February. Exports for the first seven months of the year are officially given as 32,098 metric tons.

With a view to encourage still greater production of rubber, the French Government has reportedly decided to subsidize planters by buying rubber from them at a fixed rate of 3.20 piastres per kilogram; planters here have been receiving only 2.20 piastres per kilogram. The Government is to act through an Indo-Chinese Rubber Purchasing Board which, however, is only to operate if market conditions are such as to warrant price support; there is to be no restriction of free trading on the local rubber market.

AUSTRALIA

Manufacture of tires and tubes in Australia continues to increase. To August, 1947, the monthly averages over 1946-47 were 140,000 tires for motor vehicles and airplanes and 100,000 cycle tires; whereas the averages over 1938-39 had been 113,000 and 70,000, respectively. In August, 1947, the output of each type of tire increased further to 150,000 and 126,000, respectively. Production of inner tubes also rose substantially in August, reaching a total of 74,000 cycle tubes and 142,000 larger tubes.

Hitherto three large companies have dominated the Australian rubber industry—Dunlop, Goodyear, and Olympian. Last year, however, Firestone also entered the field, establishing a new company, Firestone (Australia) Ltd., with a capital of £1,000,000, at Finsbury, South Australia. Manufacture will be concentrated chiefly on tires, and it is expected to employ about 900 Australian workers. The first directors of Firestone (Australia) Ltd., are Hank Miller, of the parent company, and F. E Piper, a lawyer of Adelaide, South Australia.

The Australian Section of the Institution of the Rubber Indus-

try is making good progress. At the second general meeting of the section held in Sydney on October 9, 1947, it was reported that during the year eight ordinary meetings had been held in that city and the same number in Melbourne. It was added that there was every hope that classes in rubber technology would eventually be established in Australia.

NETHERLANDS INDIA

From figures compiled in Washington it appears that the rubber production in Netherlands India during the first nine months of 1947 may be put roughly at 207,000 tons. Included were 148,952 tons from Sumatra and 42,743 from Dutch Borneo. The data indicates that there was a fairly steady rise in outputs to May, 1947, succeeded by a period of rapid decline until in August production was less than at the beginning of the year. The trend now seems to be toward increased output again, which may be expected to be accelerated by the new agreements between the Indonesians and the Dutch.

CEYLON

The Ceylon Government, which had been paying 65 rupee cents a pound for No. 1 grade rubber, has decided to bring it's price into line with world prices and accordingly has announced a reduction in its price to 55 rupee cents a pound.

LATIN AMERICA

Mexico

Bakelite de Mexico S. A., a subsidiary of Bakelite Corp. of New York, recently began operations, as its initial venture, in a new plant on a 3½-acre site at Monterrey, N. L., Mexico, for the production of molding materials. The new factory, construction on which was started in October, 1946, will produce Bakelite general-purpose phenolic materials. Established to assure the fast-growing Mexican industry of an adequate supply of raw plastic materials, the plant will also serve as Mexican sales agent for all Bakelite Corp. products made at Bound Brook, N. J. All goods will be sold under the registered trade marks Bakelite and Vinylite. The Mexican plant will employ local labor under the supervision of three men experienced in the manufacture of plastics in the United States: Norman Meyer, managing director; Bruce Duffett, technical superintendent; and Herbert Brach, sales manager. The main sales office of Bakelite de Mexico S. A. will be at Sidar Y Rovirosa 118, Mexico, D. F., Mexico.

Brazil

The Brazilian Government has included in its restricted imports all automobile, airplane, and machinery replacement parts or accessories made entirely of natural or synthetic rubber, leather, or plastics. These goods are now subject to import licences.

Cuba

Excessive imports, far above the island's requirements, have led the Government of Cuba to impose restrictive measures on the importation of tires and tubes, and effective December 1, 1947, all such shipments will require licences. It is further learned that a quota system for imports of tires and tubes is being planned.

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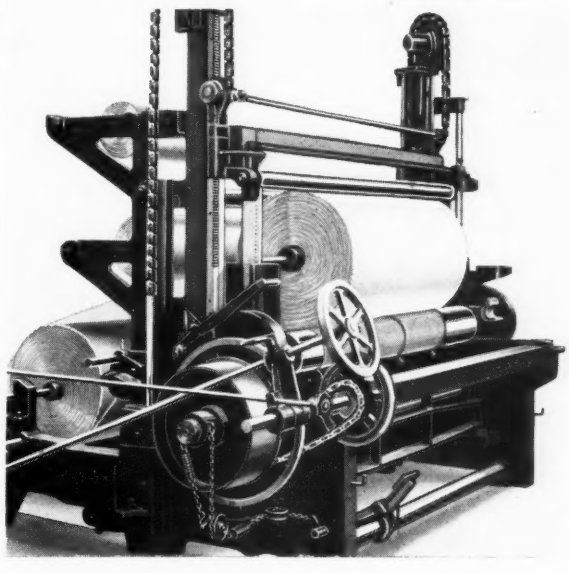

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Editor's Book Table

BOOK REVIEWS

"Today's Furnace Blacks." Isaac Drogin and Hester R. Bishop. United Carbon Co., Inc., Charleston, W. Va. Paper, loose-leaf, 8½ by 11 inches. 171 pages.

This second in a series of recent publications by United Carbon Co., (the first, entitled "Development and Status of Carbon Black," was published in 1945) presents an extensive review of the properties of all types of furnace carbon blacks used at this time, together with an evaluation of these blacks in natural rubber and GR-S. Included also are chapters on the behavior of different blacks in natural and synthetic rubbers other than GR-S, and details of manufacture of furnace blacks and statistics on carbon black consumption, rubber consumption and tire and automobile production for the years 1935-1946.

The authors call attention to the fact that marked improvements in the processing, reinforcement, and wear resistance of furnace blacks have broadened their uses in various rubbers, and they now challenge the supremacy of channel black. Since furnace blacks provide a fertile field for solving postwar tire problems and create outlets for new applications, the authors feel that a review of today's furnace blacks is timely. The material in the book was given in a condensed form by the authors before the meeting of the Division of Rubber Chemistry, A. C. S., May 27, 1947, at Cleveland, O.

The book has a large amount of laboratory test results in the form of tables and graphs on the evaluation in natural rubber and GR-S, the effect of accelerator reduction, the effect of blends of reinforcing furnace blacks with other blacks, the effect of increased black loadings, and the effect of various accelerators.

There are also subject, name, and patent indices.

"Fabric Structure." John H. Strong. Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. Cloth, 8½ by 5½ inches, 240 pages. Price $6.

This is a valuable and authoritative work on the structure of fabrics by an English author having nearly 50 years of experience in the field. The book discusses in great detail not only the finished products and their methods of manufacture, but also the various threads used in weaving. Explanations of the characteristics, requirements, testing, and treatment of the threads are included. Profusely illustrated throughout, the volume has added value because of the joint use of photographs and weave diagrams to explain the structure of many fabrics.

Contents cover design paper and plain cloths; regular twills; satins and sateens; drafts and peg-plans; weave or reverse twills; interlocking twills and satins; steep and reclining twills; patterns between diagonal ribs of twills; rearranged twills; open-work effects; honeycomb weaves; shading in woven fabrics; weave of fabrics in subsequent cure; pique fabrics; extra weft and warp fabrics; pile weaving; backed and double fabrics; gauze and leno weaving; novelty fabrics; and problems in rayon weaving. An adequate index is appended.

"Le Caoutchouc, Materiau de Construction." Institut Français du Caoutchouc, with the cooperation of Georges Colin, Andre Jarrijon, and Pierre Thirion. Published by Dunod, Paris, 1948. Paper, 5⅛ by 8¼ inches, 242 pages.

This study on rubber as engineering material fills a gap in French sources of information on the uses of the versatile commodity—rubber. Begun at the Institut Français du Caoutchouc early in 1945 at the instigation of the editor of the series *"L'Actualite Technique,"* the work, as originally planned, was based on material available in France at the time, but soon after scientific publications began to arrive from England and the United States with details of the latest developments in those countries along the projected lines, and the book was immediately recast in the light of the additional new knowledge.

The work is divided into five chapters, the first of which treats of the elasticity of rubber and begins with a review of the older theories on the subject, takes up the kinetic theory of elasticity offered by Kuhn and developed by Wall, and ends with a brief section on the phenomenon of rubber crystallization. The problems connected with the manufacture of rubber and a comparison of the main characteristics of natural and synthetic rubbers are dealt with in the next chapter. In the third—and longest—chapter the physical properties are discussed in some detail, and methods of testing tensile and evaluating accompanying plastic phenomena, as well as resistance to vibration, flexing,

abrasion, tearing, and friction are described with the aid of appropriate graphs and formulae. A brief review of the other physical properties of rubber—thermal and electrical properties, aging, swelling in liquids, with warnings on the conclusions to be drawn from the results of tests, closes this section.

The two final chapters take up the subject of the actual application of rubber to various practical engineering uses. Chapter IV is devoted to the use of rubber surfaces as chemically resistant linings, journal bearings or bushings, and, in the form of sponge rubber, as soundproofing for walls and floors. Fritz and Hoover's table indicating the resistance of rubber to a large number of substances is included. The last chapter deals with the more recent applications of rubber in engineering, that is in different types of flexible connections and suspensions, and the reasons for rubber's growing popularity for these purposes are entered into. The main problems in connection with procedure and the selecton of appropriate compounds are discussed, and demonstrations of calculations on anti-vibration suspensions, various types of rubber insulators working under compression and of connections working under shear, as well as details of fatigue tests, are presented. The chapter concludes with a classified enumeration of the rubber mechanical goods of the type covered by the above considerations and definitions of some important terms used.

A bibliography and indices of subjects and authors complete a carefully prepared handbook which is bound to be of value to all concerned in the field treated.

NEW PUBLICATIONS

"Moisture Absorption Study of Philblack A and Philblack O with Other Commercial Blacks." Philblack Bulletin No. 8, December, 1947. Phillips Petroleum Co., Akron, O. 2 pages. This bulletin presents data and graphs showing the results of tests to determine the relative moisture absorption rate of Philblack A, Philblack O, and four other commercial blacks of the EPC, SRF, HMF, and VFF types. Tests were conducted in atmospheres of 32, 66, and 98% relative humidities.

"Link-Belt Bulk-Flo." Book No. 2175. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. 48 pages. This booklet illustrates and discusses the company's Bulk-Flo conveyers, which combine the functions of an elevator, conveyer, and feeder in one compact, adaptable unit. Engineering data in the form of charts, tables, and diagrams are offered to determine the Bulk-Flo size and operating speed for a given handling capacity and weight of material to be handled.

"The Use of Perbunan in Vinyl Resins." Tentative Supplement No. IX to Perbunan Manual. Enjay Co., Inc., 15 W. 51st St., New York 19, N. Y. 14 pages. This booklet gives a general discussion of the use of Perbunan in polyvinyl chloride resins including compounding, processing, mixing procedures, extrusion, calendering, molding, and physical properties. Tables of properties are given showing the effect of the different Perbunan grades in various vinyl formulations.

"Westinghouse Equipment for the Rubber Industry." Booklet B-3731. Westinghouse Electric Corp., Pittsburgh, Pa. 36 pages. This illustrated booklet describes the research, engineering, and service the company provides the rubber industry in power and power distribution and in specialized applications such as high-frequency heating, water cooling, air handling, lighting, and electronic air cleaning.

"The U. S. Rainbow Light-Duty V-Belt." United States Rubber Co., Rockefeller Center, New York 20, N. Y. 84 pages. This is a new V-belt catalog which contains comparison tables, selection data, and other detailed information on V-belts for different applications."

"Water Columns and Gages." Bulletin WG-1811. Yarnall-Waring Co., Mermaid Lane, Philadelphia 18, Pa. 20 pages. This bulletin covers operation of the Hi-Lo water column alarm; construction details of columns, try-cocks, and gages; gage inserts; column-gage units; reflecting mirrors and illuminators; remote water level indicators; dimensions and prices; parts list; typical installations; and representative users.

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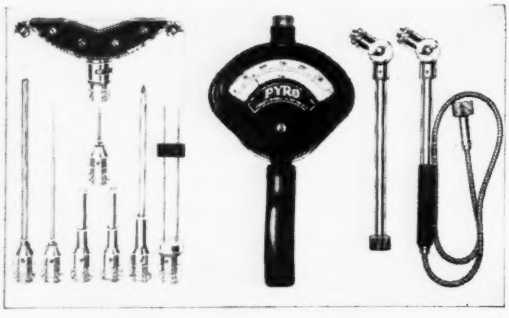

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"Koppers sec-Butylbenzene." Technical Bulletin C-7-104. Koppers Co., Inc., Pittsburgh, Pa. 1 page. This bulletin gives both technical data and commercial information on sec-butylbenzene, now available from Koppers in commercial quantities.

"Chemical Engineering Catalog, 1947-48." Thirty-Second Annual Edition. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 11 by 8 inches, 1584 pages. The current edition of this standard reference volume continues the format of preceding issues. Included are an alphabetical index of firms represented, a trade name index, a classified index and catalog section of manufacturers of equipment and supplies, a classified index and catalog section of chemical and material manufacturers, and a section on technical and scientific books available from various publishing companies.

"Symposium on Rubber Testing." Special Technical Publication No. 74. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 114 pages. Price $2 to non-members; $1.50 to members. The eight technical papers and introduction comprising this booklet were presented as a symposium during the Society's fiftieth annual meeting in Atlantic City, N. J., in June, 1947. Topics covered include the significance of voluntary standards in the rubber industry; functions of Rubber Reserve; chemical analysis of synthetic rubber; methods of stress-strain testing; test for evaluating processibility; standardization of testing in government rubber plants; testing and grading of wild and plantation rubbers; and statistical methods in rubber evaluation.

"Goodyear Bicycle Tires & Tubes." Goodyear Tire & Rubber Co., Inc., Akron 16, O. 6 pages. This illustrated folder describes Goodyear's line of bicycle tires and tubes and semi-pneumatic toy tires. Featured are the Double Eagle, DeLuxe, and G3 All Weather bicycle tires, which are described in detail, and their construction is shown.

Publications of Dewey & Almy Chemical Co., Cambridge 40, Mass. **"Darex Copolymer X-34."** Technical Bulletin C-1. 4 pages. A description appears of Darex Copolymer X-34, together with information on processing, mixing procedures, and applications in both low cost and high quality compounds. **"Darex Copolymers in Natural Rubber."** Technical Bulletin C-2. 3 pages. This bulletin gives formulations and physical properties obtained by using different quantities of Darex Copolymers Nos. 3 and X-34 in various natural rubber stocks. **"Properties of Darex Copolymer Latices (High Styrene Rubber Resins)."** Latex Data Sheet L-2. 1 page. Information is given on the properties of the latex and dried film forms of Darex Copolymer latices 3-L, 9-L, X34-L, and X44-L.

Research—*A Journal of Science and Its Applications.* Published monthly by Butterworths Scientific Publications, Ltd., 4-6 Bell Yard, Temple Bar, London, W.C.2, England. Available in the United States from Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., at subscription rate of $10 per year. **"Rayon Mile by Mile**—Perfect Inch by Inch!" Industrial Rayon Corp., Cleveland, O. 24 pages. **"Code of Ethics for Arbitrators.** Some Basic Principles of Right Conduct." American Arbitration Association, 9 Rockefeller Plaza, New York 20, N. Y. 10 pages. **"Highway Safety**—A Review and Forecast." Paul G. Hoffman, president, Studebaker Corp. First SAE David Beecroft Memorial Lecture. October 14, 1947. 22 pages.

BIBLIOGRAPHY

Softeners for GR-S Tires. I. V. V. Wheeler, R. M. Vance, F. M. McMillan, B. O. Blackburn, *Rubber Age (N. Y.)*, July, 1947, p. 437. **II.** F. M. McMillan, V. V. Wheeler, and B. O. Blackburn, *Ibid.*, Aug., p. 555.

Characteristics, Properties, and Applications of Geon Polyblend. J. E. Pittenger, G. F. Cohan, *Rubber Age (N. Y.)*, Aug., 1947, p. 563.

Development and Standardization of Tests for Evaluating the Processibility of Rubber. R. H. Taylor, J. H. Fielding, M. Mooney, *Rubber Age (N. Y.)*, Aug., 1947, p. 567; Sept., p. 705.

The Effect of Air Circulation by Convection in the Test Tube Method of High-Temperature Aging of Synthetic Rubbers. A. E. Juve, H. Boxser, D. F. Reahard, Jr., S. R. Doner, J. F. McWhorter, C. G. Cashion, G. D. McCarthy, R M. Howlett. *ASTM Bulletin*, Aug., 1947, p. 51.

Carbon Blacks. Their Manufacture and Use in Industry. A. Speedy, *Chemistry & Industry*, 354 (1946).

German Research Defeats a World Monopoly of Rubber. F. Holmann, *Gummi-Ztg.*, 55, 848 (1941).

Eliminating the Destruction of Rubber from *Kok-saghyz* in the Biological Treatment of the Roots. S. Klupt, *Doklady Vsesoyuz. Akad. Selsko-Khoz. Nauk im. V. I. Lenina*, 10, 9/10, 16 (1945).

Rubber Vulcanization Accelerators. VIII. C. Philipp, *Gummi-Ztg.*, 55, 803 (1941).

A Classification of Plastics. H. Bouman, R. Houwink, C. P. A. Kappelmeier, *Oil Colour Trades J.*, 110, 634 (1946).

Thermosetting Vinyl Polymers. E. L. Kropa, *Trans. Electrochem. Soc.*, 90, 15 pp. (1946).

Manufacture of Tire Cords from Spun Rayon Yarn. K. Kobayashi, *Textile Research J.*, 16, 500 (1946).

Plastics and Rubber. H. A. Winkelmann, *Plastics & Resins*, 5, 8, 7, 28 (1946).

Regulator Theory in Emulsion Polymerization. I. Chain Transfer of Low-Molecular-Weight Mercaptans in Emulsion and Oil Phase. W. V. Smith, *J. Am. Chem. Soc.*, 68, 2059 (1946).

Part Played by the Different Organs of the Plant in Rubber Formation. A. A. Prokof'ev, *Compt. rend. acad. sci. U.R.S.S.*, 52, 85 (1946).

Initiation and Growth of Butadiene Resinous Polymers. L. M. Welch, M. W. Swaney, A. P. Gleason, R. K. Beckwith, R. F. Howe, *Ind. Eng. Chem.*, July, 1947, p. 826.

Effects of Impurities on Copolymerization of Butadiene and Styrene. R. L. Frank, J. R. Blegen, G. E. Inskeep, and P. V. Smith, *Ind. Eng. Chem.*, July, 1947, p. 895.

Sulfur Linkage in Vulcanized Rubber. M. L. Selker, A. R. Kemp, *Ind. Eng. Chem.*, July, 1947, p. 895.

Crude Rubber Preparation. E. W. Newton, W. D. Stewart, E. A. Willson, *Ind. Eng. Chem.*, Aug., 1947, p. 978.

The Program of Brazil for the Production of Natural Rubber. N. Bekkedahl, *Rev. gén. caoutchouc*, 23, 241 (1946).

Fifty-Eight Years of Progress in the Pneumatic Tire Industry. G. Colin, *Rev. gén caoutchouc*, 23, 224, 253 (1946).

Effect of Polymolecularity on Deformation of Butyl Polymers. *Correction.* R. L. Zapp, F. P. Baldwin, *Ind. Eng. Chem.*, 38, 1288 (1946).

Vulcanization of Repaired Tires and Tubes with High-Frequency Currents. F. Miller, *Automobil'*, 24, 5/6, 11 (1946).

The Contribution of Entropy to the Elastic Properties of Keratin, Myosin, and Some Other High Polymers. H. J. Woods, *J. Colloid Sci.*, 1, 407 (1946).

The Evaluation of Synthetic Rubbers in Organic Protective Coatings. II. R. W. Matlack *et al.*, *Paint Ind. Mag.*, 61, 376 (1946).

Improved Production on Rubber Plantations. W. E. Cake, *Better Crops with Plant Food*, 30, 6, 6, 47 (1946).

The Salt Tolerance of Guayule. J. L. Retzer, C. A. Mogen, *J. Am. Soc. Agron.*, 38, 728 (1946).

Chemical Utilization of Peat. C. W. Davis, *Can. Chem. Process Inds.*, 30, 12, 86 (1946).

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WEEK-END CLOSING PRICES

	Nov. 29	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24
Jan.	21.65	22.45	23.15	22.40	21.50	21.15
Feb.	21.35	22.35	22.85	22.30	21.50	21.15
Mar.	21.22	22.24	22.70	22.20	21.50	21.15
Apr.	20.85	21.45	21.85	21.20	20.40	20.20
May	20.70	21.35	21.75	21.13	20.30	20.00
June	20.44	20.95	21.45	20.50	19.65	19.50
July	20.34	20.85	21.35	20.42	19.55	19.40
Aug.	20.10	20.55	21.00	20.05	19.15	19.10
Sept.	20.00	20.45	20.89	19.95	19.05	19.03
Oct.	20.00	20.45	20.85	19.95	19.00	18.95
Nov.	20.00	20.45	20.85	19.95	18.95	18.90
Dec.	20.00	20.45	20.85	19.95	18.85	18.85
1949						
Jan.-Mar.	20.00	20.45	20.85	19.95	18.85	18.85

THE Commodity Exchange crude rubber futures market was fairly active during January as prices moved irregularly downward. March futures opened the month at 22.70¢ and fluctuated between 22.80¢ and 22.05¢ during the first two weeks of trading marked by commission house and dealer buying, the initial strength of the primary markets, and the drying up of recent offerings from Amsterdam. Toward the end of the second week the market was quite thin, reflecting the weakening primary markets and uncertainty over negotiations in Netherlands India. When news of the impending agreement between the Dutch and native leaders there became known on January 16, the futures market broke and prices tumbled, March futures dropped 90 points in two days. Prices declined throughout the remainder of the month, and March futures closed at 21.20¢.

World rubber markets were greatly concerned over negotiations in Netherlands India since an agreement, if effective, could go a long way toward restoring the Indies as a principal source of natural rubber. In this connection, a Dutch official recently predicted that the Indies will be turning out rubber at or near prewar rates by the end of this year. Whether or not this output can be actually accomplished, a firm political agreement in the Indies would have a great leverage effect on the rubber markets.

A short-lived break in the price decline caused by the Netherlands India truce pact came on January 20 with the introduction of a bill by Rep. Paul W. Shafer. The bill, recommending a reduction in mandatory synthetic rubber usage, had a direct influence on trading, particularly in the primary markets. The recovery was only temporary, and abetted by the weakening primary markets and general uncertainty and nervousness in other commodity markets, rubber futures continued their decline unchecked during the balance of January.

The market failed to reflect to any large extent the reports from London that Britain has, on request of the United States, furnished details of amounts of rubber the United Kingdom is prepared to sell to the American stockpile. Sales of such British stocks would mean some reduction in American governmental buying in the free market. The British official price of 20.61¢ a pound to its domestic consumers is far above current free market rates, and this difference is expected to make any agreement difficult. Traders are not discounting the possibility of a compromise, however, and official reports indicate that the United Kingdom may make available about 50,000 long tons.

Trading was quite active on the Exchange, although representing mainly dealer and commission house buying and selling. The total volume of sales during January was 32,510 tons, a new monthly record, and compares with the previous record of 28,790 tons set during December.

The Commodity Exchange reported that rubber stocks in the Malayan Union, excluding Singapore, totaled 76,343 long tons at the end of December, against 80,275 long tons at the end of November. December exports totaled 66,257 long tons, only moderately higher than the 64,435 long tons exported during November. Exports to the United States in December were 21,196 long tons, as against 23,980 long tons in November. Production in the Malayan Union during December was 58,673 long tons, and imports were 3,934 tons, contrasted with 54,469 long tons and 4,150 tons, respectively, during November.

Fixed Government Prices*

Guayule

Guayule *(carload lots)*	$0.17½

Latex†

Hevea, normal *(tank car lots)*	.30¾
Centrifuged *(tank car lots)*	.32½
GR-S, Type 2 *(tank car lots)*	.18½‡
(Carload, drums)	.268
(Less carload, drums)	.273
Types 3 and 4 *(tank car lots)*	.18½‡
(Carload, drums)	.26
(Less carload, drums)	.26½
Type 5 *(tank car lots)*	.20½‡
(Carload, drums)	.27¾
(Less carload, drums)	.27¾

Plantation Grades

No. 1X Rubber Smoked Sheets	.23
1X Thick Pale Latex Crepe	.29
1 Thick Pale Latex Crepe	.29
2 Thick Pale Latex Crepe	.28½
3 Thick Pale Latex Crepe	.28¾
1X Thin Pale Latex Crepe	.29
1 Thin Pale Latex Crepe	.29
2 Thin Pale Latex Crepe	.28½
3 Thin Pale Latex Crepe	.28¼
Liberian A	.28⅝
AA	.29
RCMA Watermarked Crepe No. 16	.37⅞
17	.32⅜
18	.30⅞
Sole Crepe Trimmings	.28½
No. 1X Thin Pale Latex Crepe Trimmings	.28½
1X Brown Crepe	.21⅞
2X Brown Crepe	.21⅝
2 Remilled Blankets (Amber)	.21¾
3 Remilled Blankets (Amber)	.21⅝
Rolled Brown	.185

Synthetic Rubber

GR-M (Neoprene GN)	.27½
GR-S (Buna S)	.18½
GR-I (Butyl)	.18½

Wild Rubber

Upriver Coarse (crude)	.12⅝
(Washed and dried)	.20¼
Islands Fine (crude)	.14⅝
Washed and dried)	.22½
Caucho Ball (crude)	.11⅝
(Washed and dried)	.19½
Mangabiera (crude)	.08½
(Washed and dried)	.18

* For a complete list of all grades of dry rubbers see Rubber Reserve Co. General Sales and Distribution Circular, July 1, 1945, as amended.
† Prices per pound total solids.
‡ Plus average freight charge of 0.75¢ per pound dry weight.

New York Outside Market

WEEK-END CLOSING PRICES

	Nov. 29	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24
No. 1 Ribbed Smoked Sheets:						
Jan.	21.88	22.63	23.00	22.00	21.75	21.25
Feb.	21.88	22.63	22.88	22.00	21.75	21.25
Mar.	21.88	22.63	22.75	22.00	21.75	21.25
Apr.-June	21.25	21.63	22.63	21.25	20.50	20.25
No. 3 Ribbed Smoked Sheets ..	21.75	22.50	22.50	21.50	21.25	20.75
No. 2 Amber	18.00	17.25	17.88	17.25	17.25	16.75
Flat Bark..	15.25	14.25	15.00	14.25	14.00	13.50

ACTIVITY in the New York Outside Market last month was very light, with dropping prices closely paralleling movements in the futures market. Factory interest was small and sporadic throughout the month. Market undertones were weak as a consequence of the cautious buying policies being pursued by the major consumers who did their buying in small, scattered lots on a hand-to-mouth basis. Such buying as did take place was concentrated in nearby deliveries and appeared to be on a fill-in basis. Toward the end of January, offerings were said to be more available, particularly from the Far East, but were priced at higher than local market levels.

The spot price for No. 1 Ribbed Smoked Sheets was 23.00¢ on January 2 and 5, the first two trading days, and was the peak for the month. The spot price moved irregularly downward from 22.88¢ to 22.00¢ during the first two weeks in January and then broke on January 16 with the news of the Netherlands India pact. Thereafter prices moved downward, reaching 20.88¢ on January 27 and closing the month at 21.00¢.

Latices

THERE is a definite swing away from the preparation of normal 38% *Hevea* latex by producers, according to Arthur Nolan, Latex Distributors, Inc., writing in Lockwood's January *Rubber Report*. There has usually been a good demand for this latex because of its lower price as compared with concentrates, its smaller particle size, its higher stability at low solids concentrations, and because its non-rubber constituents are useful as protection against aging. Now, however, producers are finding this normal latex unattractive to handle as compared with concentrates which have lower freight costs, less handling, and, if drummed, lower packaging costs.

Interest exists in *Hevea* latices of types other than conventional ammonia-preserved concentrates. Multi-purified types, either creamed or centrifuged, are being used in wire insulation and certain textile applications. They are also useful in medical and surgical items where such deproteinized rubber has superior resistance to the effect of repeated sterilization. In a short time, perhaps by mid-year, all latex imported will have been clarified at least once to remove earth and other matter, Mr. Nolan believes. Such removal of undesirable components makes for cleaner, better-colored rubber and more uniform fluid characteristics in making dipped goods. Other latex preservatives are under extensive investigation. Sodium pentachlorphenate-preserved latices are used more widely in England and on the Continent than here, with no apparent difficulties. There is a definite consumer reluctance to use such latex until further work is performed on its possible toxic effects.

Production and demand of GR-S latex continues high. Some concern is felt that

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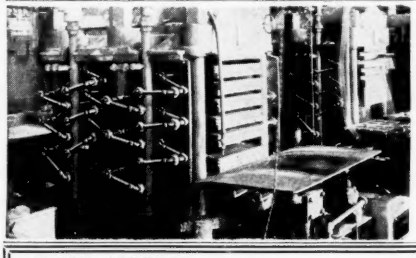

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GR-S latex may be in tight supply for the next few months because of the tight situation of solid GR-S. Some observers feel that more *Hevea* latex may be used because of this expected scarcity in GR-S latex.

Current prices per pound of *Hevea* latex are given as follows: tank car lots, 30⅜¢; carload drums, 33.5¢; less than carload (10 or more drums), 34¢; and less than 10 drums, 34.5¢. Prices per pound for neoprene latices are: tank car lots, 29-32¢; carload drums, 33.5-36.5¢; less carload drums, 34-37¢; and drums f.o.b. warehouse, 35.5-40¢. For GR-S latices, the prices per pound of Type 2 latex are as follows: tank car lots, 18.5¢ plus average freight charge; carload drums, 26.8¢; and less carload drums, 27.3¢. Types 3 and 4 GR-S latex are priced as follows: tank car lots, 18.5¢ plus freight; carload drums, 26¢; less carload drums, 26.5¢. Prices for Type 5 GR-S latex are: tank car lots, 20.25¢ plus freight; carload car lots, 20.25¢ plus freight; carload drums, 27.75¢. All latex prices given above are based on weight of total solids.

Imports of *Hevea* latex for November totaled 1,994 long tons, dry weight, giving an 11-month 1947 total of 15,396 long tons. November consumption was 1,760 long tons (11-month total consumption, 12,101 long tons), and end-of-month stocks were 5,184 long tons excluding approximately 2,000 long tons of government stocks. November production of GR-S latex was 2,237 long tons, giving a total of 20,286 long tons for the 11 months of 1947. Production of neoprene latex during November totaled 343 long tons, making an 11-month 1947 total amounting to 5,704 long tons.

SCRAP RUBBER

THE scrap rubber market was firmer during January, although dealers cautioned against any excessive optimism. The heavy snowfalls and cold weather had a restrictive effect on movement of scrap rubber. Although somewhat quieter toward the end of the month, the market retained its steady undertone.

Prices showed a general advance. Mixed auto tires moved up to $13.00 per net ton in the East and $14.50 in Akron. Peelings were in short supply and were up in price to $50 per net ton for No. 1, $31 for No. 2, and $29 for No. 3. Trading in tubes continued at a good pace with mixed tubes quoted at 4.25¢ a pound, red passengers at 7¢, black passengers at 5.25¢, and black truck tubes at 5¢, all showing advances in price of from 0.25-1.25¢ a pound.

Exports of scrap tires and tubes continue to be restricted by the inability of foreign purchasers to secure import licenses, and by the dollar shortage abroad.

Following are dealers' buying prices for scrap rubber in carload lots delivered to mills at points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$13.00	$14.50
S.A.G. passenger (natural)	nom.	nom.
Truck (natural)	nom.	nom.
Peelings (natural), No. 1	50.00	50.00
No. 2	31.00	31.00
No. 3	29.00	29.00
	(¢ per Lb.)	
Mixed auto tubes	4.25	4.25
Red passenger tubes	7.00	7.00
Black passenger tubes	5.25	5.25
Truck tubes	5.00	5.00
Mixed puncture-proof tubes	0.50	0.50
Air brake hose	nom.	nom.

RECLAIMED RUBBER

NO CHANGES occurred in the reclaimed rubber market during January. Production continued at a high level, demand remained firm, and exports were high. Forecasts are optimistic for at least the next few months, especially in view of the relatively high price for natural rubber.

Final October and preliminary November statistics on the reclaimed rubber industry are now available. Production of reclaim during October totaled 25,648 long tons; consumption, 26,735 long tons; exports, 1,016 long tons; and month-end stocks, 36,643 long tons. For November, preliminary statistics show a production of 23,145 long tons; consumption, 23,425 long tons; exports, 1,339 long tons; and end-of-month stocks, 36,347 long tons.

There were no reclaimed rubber price changes last month.

Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire	1.18-1.20	8 / 8.5
Peel	1.18-1.20	9 / 9.5
Inner tube		
Black	1.20-1.22	12.75/13.25
Red	1.20-1.22	13.5 /14
GR-S	1.18-1.20	9.5 /10
Butyl	1.16-1.18	8.5 / 9
Shoe	1.50-1.52	8.25/ 8.75

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Nov. 29	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24
Mar.	35.59	35.76	35.91	35.84	35.60	34.71
May	35.22	35.55	35.73	35.77	35.65	34.80
July	34.28	34.42	34.56	34.57	34.62	34.23
Sept.	32.23	32.48	32.65	32.71	32.70	32.44
Nov.	30.80	31.41	31.46	31.57	31.50	31.40
1949						
Mar.	30.20	30.65	31.05	31.13	31.11	31.11

THE cotton market was erratic during January, with traders uncertain as to its future course. There was a wide divergence of opinion over prospects in the near future. One commission house stated that a nervous, irregular market is in the offing; while another expressed the belief that a quiet, steady tone was to be expected. In general, most quarters agreed that the near months would fall back, and professional traders appeared to be moving out of the market. It was admitted that any definite signs of renewed buying by foreign interests would cause a sharp upswing, but whether or not this upswing could be sustained was a matter for conjecture.

The 15/16-inch middling spot price opened the month at 36.73¢ and dropped during the first few trading days because of liquidation, hedge selling, and delays in the Army's plan to purchase cotton for Japan. Prices recovered and rose to the monthly peak of 36.83¢ on January 12 in anticipation of export buying. The market broke on January 13, and prices tumbled as no foreign orders materialized, and the belief was general that the advances of the preceding week had caused an overbought condition. For the remainder of the month, prices moved irregularly downward and showed some signs of leveling off as the end of the month approached. Contributing to this downtrend were reports that foreign buyers would demand finer grades than they had previously accepted, a belief that the European Recovery Plan would not be approved in time to affect old-crop cotton, the Baruch program urging commodity and price controls, and a general attitude of nervousness as large traders liquidated short coverings and small traders scrambled to get out of the market.

Cotton consumption for December was estimated by the New York Cotton Exchange Service at 755,000 bales, as compared with 760,000 bales in November and 776,000 bales in December, 1946. Observers felt that the lower consumption figures indicated a growing trend toward lightweight goods.

Fabrics

Large purchases of chafer and other fabrics by the rubber trade for delivery through April were reported in the cotton gray goods market last month. The action of the rubber industry in buying goods so far ahead resulted from the short supply of these fabrics which forced the industry to abandon its month-to-month purchasing program. A 2¢ rise in chafer prices was announced by a few mills at the beginning of the month and met with some resistance, but by the end of January practically all producers were quoting the higher prices on chafers. The 14-ounce per square yard ply was quoted at 75.5¢, and the single filled at 77.5¢; while the 10.80-ounce single was quoted at 72¢ and the 11.65-ounce single sold at 70.5¢.

Wide sateens were strong during January, and prices were firm. Broken twills showed little activity during the month, but wide drills were in demand for second-quarter delivery. Sheetings were moderately acitve, and prices held steady, particularly for narrow sheetings. Ducks were strong, and numbered and enameling types were in greatest demand. All numbered ducks continued to be quoted at 39% off list; while hose and belting ducks were quoted at ranges from 68.5-69.5¢ by most of the large producers. Osnaburgs moved slowly, and demand was spotty.

RAYON

FOLLOWING the lead of E. I. du Pont de Nemours & Co., Inc., all but one of the large rayon producers to date have announced price increases on filament yarn and staple. For all but du Pont, the new prices will begin with February contract deliveries. The price increases varied from company to company for regular tenacity viscose coned yarns which formerly sold at 67¢ a pound from all producers and are now quoted both at 74 and 75¢ per pound. Prices of the high tenacity tire-type viscose yarns were advanced a uniform 2¢ a pound by all producers except one. The current prices of three producers for tire yarn on beams or cones are as follows: 1100 and 1150 denier, 55¢; 1650 denier, 54¢; and 2200 denier, 53¢. The other producer made no change in its tire yarn prices and continued to quote its 1100 and 1650 denier yarns at 53¢ and 52¢ a pound, respectively.

A recent survey of the domestic rayon producing industry indicates an expected overall poundage increase of 15% in plant

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capacity during the next two years. On an annual basis the industry's capacity by October, 1949, is planned to total 1,175,000,000 pounds, as compared with the present operating capacity of 1,022,000,000 pounds. The greatest increase is planned by the acetate division of the industry where the yarn plus staple capacity is expected to reach an annual rate of 422,000,000 pounds, 32% above the current level, by late 1949. Over the same period, viscose plus cupra yarn and staple capacity is projected to 753,000,000 pounds, an increase of 7% over present output. High tenacity viscose yarn capacity is to be increased from the current annual rate of 233,000,000 pounds to 270,000,000 pounds by the end of 1949, a gain of 16%. Part of this increase will come from the new American Enka plant, but a substantial part will arise from higher spinning speeds on existing equipment and a further raising of the average denier of yarn spun.

United States Rubber Statistics, October, 1947

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Stocks End of Month
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	*46,255	46,255	55,468	314	109,554
Natural latex, total	0	3,085	3,085	1,818	0	4,561
Natural rubber and natural latex, total	0	49,340	49,340	57,286	314	114,115
Synthetic rubber, total	† 32,292	0	33,834	45,668	194	67,379
	‡ 1,542					
GR-S	† 27,296	0	27,624	36,190	13	§44,848
	‡ 328					
Butyl	† 3,266	0	3,266	6,001	5	13,731
Neoprene	† 1,730	0	2,325	3,056	125	5,276
	‡ 595					
Nitrile	619	0	619	421	51	3,524
Natural rubber and latex, and synthetic rubber: total	33,834	49,340	83,174	102,854	508	181,494
Reclaimed rubber, total	25,648	0	25,648	26,735	1,016	36,643
GRAND TOTALS	59,482	49,340	108,822	129,589	1,524	218,137

* Includes 46,891 for October and adjustment of minus 634 applicable to July and August.
† Government plant production.
‡ Private plant production.
§ Includes 43 tons shipped for export, but not cleared.

Compounding Ingredients—Price Changes and Additions

Accelerators, Organic

Butyl Zimate	lb.	$1.00	
Cumate	lb.	1.45	
Ethyl Tuads	lb.	1.00	
Zimate	lb.	1.00	
Ledate	lb.	1.00	
Methyl Tuads	lb.	1.10	
Zimate	lb.	1.00	
S. A. 52	lb.	1.10	
57, 52, 67, 77	lb.	1.00	
66	lb.	1.45	
Selenac	lb.	1.45	
Tellurac	lb.	1.45	

Carbon Blacks

(EPC) Wyex	lb.	.065	
(MPC) Arrow TX	lb.	.065	
(HPC) HX	lb.	.065	
(HAF) Philblack O	lb.	.07	

Colors—White

Rayox LW	lb.	.175	$0.185
R-110	lb.	.195 /	.205
Ti-Cal	lb.	.0675	
Ti-Pure	lb.	.175	.195

Dusting Agents

Pyrax A	ton	12.50	
W. A.	ton	14.00	
Vanfre	gal.	2.00	2.50

Extenders

B. R. S. 700	lb.	.0175	.026
B. R. T. No. 7	lb.	.0265	.0275
Hard Hydrocarbon	ton	42.00 /	44.00

Fillers, Inert

Pyrax A	ton	12.50	
W. A.	ton	14.00	
Ti-Cal	lb.	.0675	

Latex Compounding Ingredients

Darex Copolymers Nos. 3-L, 9-L, X34-L, X44-L (total solids)	lb.	.365	.50

Plasticizers and Softeners

Bardol	lb.	.0275	.0375
B	lb.	.055 /	.0575
B. R. C. Nos. 18, 19E, 20, 22	lb.	.0125	.0135
No. 4	lb.	.013 /	.0235
B. R. H. No. 2	lb.	.02	.029
B. R. S. 700	lb.	.0175 /	.026
B. R. T. No. 4	lb.	.0265	.0275
B. R. V.	lb.	.0325	.049
Bunarex-10, -25, -40	lb.	.075 /	.125
-55, -115	lb.	.07 /	.12
-70, -100	lb.	.065 /	.115
Butac	lb.	.11 /	.12
Carbonex Flakes	lb.	.0325 /	.0375
S Flakes	lb.	.0475 /	.0525
Plastic	lb.	.046 /	.051
Dispersing Oil No. 10	lb.	.0525 /	.055
Picco-10, -25	lb.	.12 /	.17
-75, -100	lb.	.115 /	.165
480 Oilproof resin	lb.	.15 /	.20
S. O. S.	gal.	.29 /	.34
Piccoumaron Resin 427-R	lb.	.12	.17
Resins	lb.	.065 /	.195
Piccovars	lb.	.0975 /	.1825
Piccovol	lb.	.025 /	.04
Pictar	gal.	.25 /	.30
Resin C Pitch	lb.	.02 /	.0285
Resinex	lb.	.0325 /	.0875
L Grades	lb.	.0225 /	.08
Turgum S	lb.	.095 /	.105

Estimated Automotive Pneumatic Casings and Tube Shipments, Production and Inventory—November and October, 1947; First 11 Months, 1947, 1946

	1947				1946
	November	% of Change from Preceding Month	October	First 11 Months	First 11 Months
Passenger Casings					
Shipments					
Original equipment	1,712,343		1,731,874	17,725,247	9,703,620
Replacement	4,594,763		5,094,044	49,538,925	49,576,357
Export	106,248		188,023	1,516,346	543,423
Total	6,413,354	− 8.56	7,013,941	68,780,518	59,823,400
Production	6,382,557	−13.34	7,364,743	71,168,058	60,371,664
Inventory end of month	3,990,905	− 2.87	4,108,786	3,990,905	2,293,813
Truck and Bus Casings					
Shipments					
Original equipment	385,008		445,967	4,991,800	3,767,869
Replacement	1,008,326		1,039,570	9,321,998	9,836,723
Export	108,657		139,072	1,517,313	746,966
Total	1,501,991	− 7.55	1,624,609	15,831,111	14,351,558
Production	1,333,479	−12.51	1,524,082	16,330,552	14,415,357
Inventory end of month	1,265,373	− 9.91	1,404,589	1,265,373	817,921
Total Automotive Casing					
Shipments					
Original equipment	2,097,351		2,177,841	22,717,047	13,471,489
Replacement	5,603,089		6,133,614	58,860,923	59,413,080
Export	214,905		327,095	3,033,659	1,290,389
Total	7,915,345	− 8.37	8,638,550	84,611,629	74,174,958
Production	7,716,036	−13.19	8,888,825	87,498,610	74,787,021
Inventory end of month	5,256,278	− 4.66	5,513,375	5,256,278	3,111,734
Passenger and Bus and Truck Tubes					
Shipments					
Original equipment	2,092,267		2,187,374	22,704,193	13,484,529
Replacement	4,124,496		5,278,095	46,234,479	53,466,447
Export	126,305		150,309	2,378,516	1,234,134
Total	6,343,068	−16.71	7,615,778	71,317,188	68,185,110
Production	6,456,748	−15.26	7,619,353	72,965,648	69,348,781
Inventory end of month	6,682,871	+4.03	6,423,833	6,682,871	4,482,836

NOTE: Cumulative data on this report includes adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc.

Reclaiming Oils

Bardol	lb.	$0.0275 /	$0.0375
B	lb.	.055 /	.0575
B. R. H. No. 2	lb.	.02 /	.029
B. R. T. No. 3	lb.	.024 /	.025
No. 4	lb.	.013 /	.0235
B. R. V.	lb.	.0325	.049
Dispersing Oil No. 10	lb.	.0525 /	.055
Heavy Resin Oil	lb.	.0225 /	.0325
No. 1621	lb.	.025 /	.035
Picco C-10	gal.	.25 /	.30
C-28	gal.	.33 /	.38
C-33	gal.	.215 /	.265
C-42	gal.	.30 /	.35
D-4	gal.	.23 /	.28
E-5	gal.	.21 /	.26
Q Oil	gal.	.246 /	.296

Reinforcers, Other Than Carbon Black

B. R. C. Nos. 18, 19E, 20, 22	lb.	.0125 /	.0135
Bunarex-55, -115	lb.	.07 /	.12
-70, -110	lb.	.065 /	.115
Carbonex Flakes	lb.	.0325 /	.0375
S. Flakes	lb.	.0475 /	.0525
Plastic	lb.	.046 /	.051
Clays			
Hydratex R	ton	28.00	
LGB	ton	17.00	
Paragon	ton	12.50	
Suprex	ton	13.00 /	28.70
Darex Copolymer No. X34	lb.	$0.395 /	$0.42
Magnesium carbonate	lb.	.0725 /	.125
Marbon S, S-1	lb.	.41 /	.48
Picco-75, -100	lb.	.115 /	.165
Piccoumaron Resins	lb.	.065 /	.195
Piccovars	lb.	.0975 /	.1825
Resin C Pitch	lb.	.02 /	.0285
Resinex	lb.	.0325 /	.0875

Solvents

Picco Hi-Solv solvents	gal.	.21 /	.26
Skellysolve-B	gal.	.143	
-C	gal.	.133	
-R	gal.	.109	

Synthetic Rubbers

Neoprene Latex (dry weight)			
Type 571	lb.	.29 /	.37
572	lb.	.30 /	.38
601, 601-A	lb.	.32 /	.40
700	lb.	.30 /	.38
842, 842-A	lb.	.29 /	.37

Tackifiers

Bunarex-10, -25, -40	lb.	.075 /	.125
Natac	lb.	.105 /	.115
Picco-10, -25	lb.	.12 /	.17
Piccoumaron Resin 427-R	lb.	.12 /	.17
Resins	lb.	.065 /	.19

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"COTTON FLOCKS"
does not mean cotton fiber alone

EXPERIENCE
over twenty years catering to rubber manufacturers

CAPACITY
for large production and quick delivery

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of the entire rubber industry

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of the industry's needs

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acknowledged superior by all users are important and valuable considerations to the consumer.

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CLAREMONT N. H.
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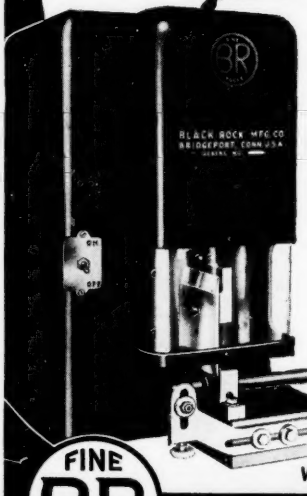

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YARWAY
IMPULSE STEAM TRAP

United States Imports, Exports, Reexports, Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	July, 1947		August, 1947	
UNMANUFACTURED, Lbs.	Quantity	Value	Quantity	Value
Crude rubber	124,018,813	$22,383,403	97,928,490	$16,207,653
Rubber latex	3,296,430	855,454	3,995,554	960,877
Guayule	165,800	27,458	235,200	24,768
Balata	42,749	24,444	356,175	159,338
Jelutong or Pontianak	642,491	122,627	320,964	78,357
Gutta percha	48,466	50,204	41,549	46,667
Chicle	1,246,478	1,073,172	56,11	20,224
Scrap rubber	1,171,303	22,349	405,005	6,026
TOTALS	130,632,530	$24,559,111	103,329,052	$17,503,900
MANUFACTURED				
Tires: auto, bus, and truck *no.*	805	$31,613	250	$2,162
Bicycle *no.*	6,297	6,719	1,910	1,426
Inner tubes	3,820	13,666	21	135
Rubber boots, shoes, and overshoes *prs.*	3,382	2,127	15	35
Rubber-soled footwear with fabric uppers *prs.*	132,624	164,146	130,656	164,646
Rubber heels and soles *doz. prs.*	500	108	.....	.....
Athletic balls: golf *no.*	9,600	2,666	12,000	3,333
Lawn tennis *no.*	18,600	3,792	190	38
Other *no.*	1,584	161	48	12
Rubber toys	.....	.....	.....	489
Hard rubber products	.....	2,322	.....	708
Rubberized printing blankets *lbs.*	539	2,276	400	722
Rubber and friction tape *lbs.*	.....	.....	2	2
Rubber and cotton packing *lbs.*	1,783	2,360	1,678	2,225
Rubber gaskets and valve packing	.....	36	.....	221
Rubber belting *lbs.*	1,465	1,661	4,350	1,880
Rubber hose and tubing	.....	993	.....	31
Soft rubber: druggists' sundries	.....	.....	.....	124
Other products *lbs.*	478,367	76,617	.....	4,710
Gutta percha manufactures *lbs.*	180	129	.....	.....
Rubber substitute products *lbs.*	2,000	410	3,854	630
TOTALS		$311,902		$183,529
GRAND TOTALS, ALL RUBBER IMPORTS		$24,871,013		$17,687,427

Reexports of Foreign Merchandise

UNMANUFACTURED, Lbs.				
Crude rubber	942,492	$226,777	428,772	$118,666
Balata	35,007	15,705	49,025	20,873
Chicle	9,350	15,112	6,667	3,202
Jelutong and gutta percha	11,200	8,000	14,375	7,744
TOTALS	998,049	$265,594	498,839	$150,485
MANUFACTURED				
Tire casings and tubes *no.*	55	$2,705	29	$1,360
Rubber and balata belting *lbs.*	1,068	945	313	354
Rubber hose and tubing *lbs.*	51	54	204	174
Rubber packing *lbs.*	1,377	2,656	.....	.....
Rubber cement *gals.*	140	232	15	52
Druggists sundries: water bottles and fountain syringes *no.*	.....	.....	1,020	421
Other products	.....	699	.....	.....
Rubberized piece goods and hospital sheeting *sq. yds.*	66	105	97	237
Other rubber products	.....	.....	.....	1,030
Compounded latex & other rubber for further manufacture *lbs.*	10,260	4,083	.....	.....
TOTALS		$11,479		$3,628
GRAND TOTALS, ALL RUBBER REEXPORTS		$277,073		$154,113

Exports of Domestic Merchandise

	July, 1947		August, 1947	
UNMANUFACTURED, Lbs.	Quantity	Value	Quantity	Value
Crude rubber	.....	.....	17,785	$3,848
Chicle	192,833	$196,143	220,517	208,392
Balata	1,000	4,750	400	1,500
Synthetic rubber: GR-S	255,105	60,070	58,669	12,298
Butyl	4,400	814	.....	.....
Neoprene	370,184	97,716	316,232	96,929
Nitrile	292,823	120,560	264,529	108,335
Polyisobutylene	26,723	8,835	853	460
Other (excluding "Thiokol")	67,477	28,184	2,205	1,185
Reclaimed rubber	2,356,637	189,923	3,166,802	261,599
Scrap rubber	7,633,774	236,042	4,707,910	134,556
TOTALS	11,200,956	$943,037	8,755,902	$829,102
MANUFACTURED				
Rubber cement *gals.*	43,260	$65,274	44,211	$71,314
Rubberized fabric: auto cloth *sq. yds.*	55,264	52,469	113,530	27,704
Piece goods and hospital sheeting *sq. yds.*	97,602	89,346	120,505	81,538
Rubber footwear: boots *prs.*	48,097	159,203	70,625	200,554
Shoes *prs.*	35,749	65,023	43,479	72,104
Rubber-soled with fabric uppers *prs.*	73,241	119,002	43,231	69,865
Soles *doz. prs.*	19,393	49,030	14,365	38,740
Heels *doz. prs.*	61,413	69,533	35,279	40,846
Rubber soling and top lift sheets *lbs.*	58,021	17,564	16,678	8,548
Rubber gloves and mittens *doz. prs.*	19,227	68,328	20,656	76,654
Druggists' sundries: water bottles and fountain syringes *no.*	87,004	46,175	47,660	34,297
Other	.....	352,102	.....	448,921
Rubber and rubberized clothing	.....	128,959	.....	135,646
Balloons	.....	195,622	.....	163,741
Rubber toys and balls	.....	55,794	.....	62,837
Bathing caps *doz.*	2,251	9,269	2,647	12,622
Rubber bands *lbs.*	16,672	13,766	8,199	5,456
Erasers *lbs.*	44,779	41,709	48,548	39,114
Hard rubber goods: battery boxes *no.*	29,110	32,964	46,788	39,416
Other electrical goods *no.*	95,436	44,769	354,167	143,710
Combs *doz.*	1,878	3,325	2,623	3,419
Other	.....	22,594	.....	16,309
Tire casings: truck and bus *no.*	147,150	5,791,368	158,796	5,817,482
Auto *no.*	195,845	2,463,032	184,539	2,384,831
Inner tubes,: auto, trucks, and bus *no.*	268,068	991,276	217,154	708,374
Other tire casings and inner tubes *no.*	111,224	777,135	79,535	793,559
Solid tires: auto and truck *no.*	38,239	1,016,522	17,900	525,340
Other *lbs.*	26,790	16,818	9,900	5,853
Tire repair materials: camel back *lbs.*	200,571	51,537	83,902	25,312
Other *lbs.*	349,302	196,125	289,738	160,535
Rubber and friction tape *lbs.*	154,336	100,260	104,467	60,186
Rubber belting: auto fan belts *lbs.*	246,338	267,477	184,247	196,739
Other *lbs.*	819,265	952,300	1,236,110	1,065,893
Hose and tubing: garden hose *lbs.*	65,186	23,299	158,651	79,125
Other *lbs.*	1,082,078	720,514	790,363	532,331
Rubber packing *lbs.*	269,993	160,334	211,832	143,242
Rubber mats, flooring, and tiling *lbs.*	535,007	187,638	762,642	226,935
Rubber thread: bare *lbs.*	35,359	55,926	94,353	135,713
Textile covered *lbs.*	20,434	63,189	11,996	28,712
Gutta percha manufactures *lbs.*	2,369	3,836	3,231	7,467
Compounded latex and other rubber for further manufacture *lbs.*	361,715	123,769	308,987	142,610
Other rubber products	.....	294,247	.....	347,154
TOTALS		$15,958,422		$15,180,757
GRAND TOTALS, ALL RUBBER EXPORTS		$16,901,459		$16,009,859

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
British Rubber Co. of Canada, Ltd.	Pfd.	$1.25 q.	Jan. 31	Jan. 13
Collyer Insulated Wire Co., Inc.	Com.	0.30 q.	Feb. 1	Jan. 24
Converse Rubber Co.	Pfd.	0.25 q.	Jan. 14	Jan. 7
Converse Rubber Co.	2nd Pfd	0.20 q.	Jan. 14	Jan. 7
Crown Cork & Seal Co., Inc.	$2 Cum. Pfd.	0.50 q.	Mar. 15	Feb. 20
Firestone Tire & Rubber Co.	Pfd.	1.12½ q.	Mar. 1	Feb. 14
General Tire & Rubber Co.	Com.	1.00 extra	Jan. 30	Jan. 20
Goodyear Tire & Rubber Co.	$5 Pfd.	1.25 q.	Mar. 15	Feb. 16
Goodyear Tire & Rubber Co.	Com.	1.00	Mar. 15	Feb. 16
Johnson & Johnson	Com.	0.10 s.	Mar. 12	Feb. 27
Lee Rubber & Tire Corp.	Com.	0.50 q.	Feb. 2	Jan. 22
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Feb. 2	Jan. 14
Okonite Co.	Com.	1.00 q.	Feb. 2	Jan. 15
Seiberling Rubber Co. of Canada, Ltd.	Com.	0.50 extra	Feb. 16	Feb. 6
Sieberling Rubber Co. of Canada, Ltd.	Com.	0.25 q.	Feb. 16	Feb. 6
Thermoid Co.	$2.50 Conv.Pfd.	0.62½ q.	Feb. 2	Jan. 23
Union Asbestos & Rubber Co.	Com.	0.17½ q.	Apr. 2	Mar. 10

Trade Lists Available

The Commercial Intelligence Division, United States Department of Commerce, Washington, D. C., recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms interested in the Division and from Department of Commerce field offices at $1 a list for each country.

Aircraft and Aeronautical Supply & Equipment Importers and Dealers—Canada; Dominican Republic; Ireland; Egypt and Cyprus; Nicaragua; Panama; Paraguay; Peru; Uruguay.

Automotive Equipment Importers and Dealers—Hong Kong.

Automotive Product Manufacturers — India; Norway; Union of South Africa.

Boot and Shoe Importers and Dealers—Canary Islands; Guatemala; Honduras; India; Morocco; Nicaragua.

Boot and Shoe Manufacturers — Philippine Islands; Syria and Lebanon.

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SITUATIONS WANTED

COMPOUND, MILL, AND CALENDER FOREMAN, WITH YEARS of experience, desires Pacific Coast position. Address Box No. 30, care of INDIA RUBBER WORLD.

TECHNICAL SUPERVISOR—16 YEARS' EXPERIENCE, COMpounding, mixing, milling, calendering, and general factory experience, footwear, thread, sundries, roll and tank. Capable of keeping costs and quality in line. Results proven. Address Box No. 31, care of INDIA RUBBER WORLD.

TECHNICAL REPRESENTATIVE: B.S., FIVE YEARS' RESEARCH and Development of organic chemicals. Technical sales experience in plastics, emulsifiers, resins, waxes, plasticizers, etc. Desires permanent technical representative position. Employed as project supervisor, synthetic rubber pilot-plant. Married. Family. Age 33. Address Box No. 32, care of INDIA RUBBER WORLD.

FOREMAN—30, TWELVE YEARS OF PRACTICAL EXPERIENCE mixing and calendering rubber and gutta percha compounds. Adept at handling personnel. Interested in position where progressive and cooperative spirit exists. Address Box No. 33, care of INDIA RUBBER WORLD.

PLANT ENGINEER—WITH OVER 35 YEARS OF PRACTICAL diversified rubber and plastics manufacturing and production experience with large and small companies, also foreign employment experience. Will accept temporary or permanent employment on plant construction work, plant layout, power plant installation, moving, erection, and installation of production equipment, plant and equipment maintenance engineering. Will advise set-up necessary to produce any type of rubber or plastic products, versed in compounding and mold designing. At present employed as Plant Engineer of large company; will go anywhere; desire to do consulting work. Address Box No. 34, care of INDIA RUBBER WORLD.

ENGINEER-EXECUTIVE—M.S. CHEMICAL ENGINEER, 31 years old, with administrative experience in production and development of synthetic rubber, plastic films and flooring, rubber chemicals, etc. Would like to submit details of professional experience to prospective employer. Address Box No. 40, care of INDIA RUBBER WORLD.

EXECUTIVE-RESEARCH-CHEMIST: TWENTY YEARS' EXperience in direction, coordination, and pursuit of research developments, through production, specifications, and controls. Rubber compounding, mechanical, and cellular. Latex processing, foam and dipped. Laboratories established. Excellent collegiate, industrial, and administrative background. Available immediately. Location immaterial. Address Box No. 41, care of INDIA RUBBER WORLD.

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Technical director of top-rated coating and combining company in New York. Research and production experience.
Textiles and metals. Rubbers and resins. Organosols, pastes, monomers, as well as older processes. Production equipment design.

Low temperatures. New resins.

Ideas and administration. Ph.D.

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BUSINESS OPPORTUNITY

ESTABLISHED RUBBER DISTRIBUTING FIRM WITH SALES organization, warehouse, and shipping facilities, seeks representation New York and vicinity of new or standard items in rubber field. Exclusive, if possible. Address Box No. 39, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

FAN BELT ENGINEER:

Major manufacturer has excellent position for experienced automotive and transmission belting engineer. Will handle design and development work and contact customers in field on engineering problems. In reply give full information covering experience, also age, education, and salary expected.

Address Box No. 27, Care of INDIA RUBBER WORLD

FACTORY MANAGER WANTED: SHOULD BE IN EARLY forties, with experience in molded and extruded rubber products. Should have executive ability and personality to maintain proper organization in the plant. For the right man, who has been successful in plant operation, we offer a permanent position at a reasonable salary with a firm whose sales for 1947 were five million dollars. Address Box No. 29, care of INDIA RUBBER WORLD.

FOREMAN—PAN RECLAIMING DEPARTMENT. TOP MAN must be fully experienced. Good pay and steady position for right party. Located East. State age, experience, previous employment, and salary requirement in first letter. Address Box No. 35, care of INDIA RUBBER WORLD.

FACTORY MANAGER EXPERIENCED IN COMPOUNDING AND manufacture of mechanical goods and solid rubber tires. Sales experience required. Excellent opportunity. Address Box No. 36, care of INDIA RUBBER WORLD.

YOUNG CHEMICAL ENGINEER—with experience in latex work. Preferably some foam rubber experience, for development and control work. Plant located in New England. Excellent future for ambitious man. Give full details first reply. Address Box No. 28, care of INDIA RUBBER WORLD.

FACTORY MANAGER: ONE CAPABLE OF TAKING COMPLETE charge of the operation in all its details of a rubber plant producing custom-built molded and extruded items for industry. Located East. Address Box No. 37, care of INDIA RUBBER WORLD.

WANTED: CHEMIST, PREFERABLY WITH PRODUCTION EXperience on dipped goods, large producer. Excellent opportunity. Address Box No. 42, care of INDIA RUBBER WORLD.

CHEMIST—EXPERIENCED IN NITROCELLULOSE COATINGS for textiles and paper. Take charge of control, development, and plant application. Address Box No. 44, care of INDIA RUBBER WORLD.

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INDIA RUBBER WORLD

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(*Classified Advertisements Continued on Page 683*)

Malayan Rubber Statistics

The following statistics for November, 1947, have been received from Singapore by way of Malaya House, 57 Trafalgar Square, London, W. C.2, England.

Ocean Shipments from Singapore and Malayan Union—In Tons

To	Sheet and Crepe			Latex, Concentrated Latex, and Revertex (Dry Rubber Cement)		
		Malayan Union			Malayan Union	
	Singapore Export Proper	Trans-shipped	Direct Shipments	Singapore Export Proper	Trans-shipped	Direct Shipments
Argentine Republic	20	31	...	...	6	...
Australia	2,680	610	1,063	30	79	2
Belgium	826	750	721	14	...	1
Canada	1,576	416	1,275	...	...	...
Chile	...	...	...	12	...	...
China	10	90	...	...	...	...
Cyprus	6	...	...	...	...	...
Czechoslovakia	425	...	...	16	...	9
Denmark	98	...	50	6	...	...
Eire	1	...	3	...	...	...
France	1,478	241	636	18	10	73
Germany	785	570	690	63	8	30
Hong Kong	236	...	70	...	...	...
Italy	332	25	551	22	55	...
Japan	500	...	...	103	...	...
Mexico	...	...	764	...	...	...
Netherlands	2,403	391	602	1	...	...
New Zealand	99	...	39	3	5	...
Norway	67	...	72	6	...	...
Other countries in Asia	...	...	1,863	...	...	...
Other countries in South America	8	...	3	...	...	...
Palestine	58	...	13	...	...	...
Poland	374	100	315	...	...	...
Portugal	28	...	7	3	...	...
Rumania	10	...	40	...	...	...
Russia	6,852	25	...	...	...	...
Spain	...	...	500	...	...	...
Sweden	225	25	145	21	...	...
Switzerland	93	...	...	...	...	...
Syria	26	...	...	...	...	...
Turkey	161	...	245	...	...	...
Union of South Africa	1,270	254	...	...	6	...
United Kingdom	6,072	2,928	5,106	328	79	139
U. S. A.	22,781	3,050	23,215	1,031	25	765
TOTAL	49,500	9,506	37,988	1,677	273	1,019

Foreign Imports of Rubber in Long Tons

	Dry Rubber	Wet Rubber (Dry Weight)
Singapore Imports from		
British Borneo	1,020	69
Brunei	209	7
Dutch Borneo	1,239	157
French-Indo China	113	2
Java	118	...
Other Dutch Islands	65	3
Rhio Residency	399	4
Sarawak	4,095	41
Siam	1,020	20
Sumatra	10,232	3,796
	18,510	4,099
Malayan Union Imports from		
Burma	396	13
Siam	1,467	31
Sumatra	966	1,277
TOTAL	2,829	1,321

Dealers' Stocks

	Tons
Singapore	46,567
Penang & Province Wellesley	14,940
TOTAL	61,507

Port Stocks in Private Lighters and Railway Godowns

Penang & Province Wellesley	5,401
Port Dickson	10
Port Swettenham	4,666
Singapore	8,581
Teluk Anson	250
TOTAL	18,908

Production

Estates	36,050
Small holdings (estimated)	18,419
TOTAL	54,469

Obituary

(Continued from page 656)

Richard J. Schmidt

RICHARD J. SCHMIDT, 60, pioneer in tire mold and rubber machinery manufacturing, died January 22 after a long illness. Services were held in Akron, with interment in Mount Peace Cemetery, January 26.

He was treasurer and factory manager of The Akron Equipment Co., Akron, O., with which concern he had been connected in an official capacity since its organization in 1917.

Mr. Schmidt was born in Germany and at the age of five came to Akron with his parents. After attending Akron schools he worked for a short time at the Akron China Co., and The Goodyear Tire & Rubber Co. He then served an apprenticeship as a machinist at The Williams Foundry & Machine Co., Akron. During this time he worked on the first non-skid tire molds made in Akron. They carried the old "Bailey" tread.

He was a member of the Zion Lutheran Church, the Isaac Walton League, and the Congress Lake Country Club.

He leaves a widow, a sister, two sons, two daughters, and five grandchildren.

Lee Barroll

LEE BARROLL, vice president and member of the board of Whitehead Bros. Rubber Co., Trenton, N. J., and Goodall Rubber Co., Philadelphia, Pa., died January 12 at the Whitehead plant. His death was caused by coronary occlusion.

Born in Elizabeth, N. J., June 2, 1887, Mr. Barroll attended Pingry School in that city and was graduated from Harvard University in 1909 with a B.S. degree in electrical engineering. Mr. Barroll, besides his executive positions in the two rubber companies, was secretary of United Public Utilities Corp. of Wilmington, Del., and Chicago, Ill. From 1918, after service in World War I, until 1935 he had been in the investment business in Baltimore, Md.

Funeral services were conducted at St. Paul's Episcopal Church, Baltimore, on January 16.

Surviving Mr. Barroll are his wife, two daughters, and a son.

Carl H. Davis

CARL H. DAVIS, veteran employe of Goodyear Tire & Rubber Co., died suddenly in his residence at Roanoke, Va., January 17, of a heart attack. Mr. Davis joined Goodyear at Akron, O., on October 8, 1914, in the sales accounting department. Later he worked on various factory assignments until 1925, when he went into the personnel efficiency department. In 1932 he entered the sales organization and in 1933 was transferred to Indianapolis district as a general line salesman. Then in 1941 the deceased was transferred to Richmond and for the past several years had been field representative for the Roanoke territory.

He was born in Clifton Forge, Va., November 15, 1892.

He leaves his wife, three sisters, and four brothers.

Funeral services were held November 20 at Roanoke, with burial at Clifton Forge.

J. Stuart Brown

J. STUART BROWN, former sales manager of Gutta Percha & Rubber Mfg. Co., Brooklyn, N. Y., died at his home in New York, N. Y., on December 31 following a heart attack. At the time of his retirement ten years ago he had been a salesman for Hewitt Rubber Corp., now Hewitt Rubber Division, Hewitt-Robins Inc., which had absorbed Gutta Percha.

Born in Rhinebeck, N. Y., in 1864, Mr. Brown is well remembered for his long association with the mechanical rubber goods industry. He was a graduate of the Degarmo Institute, Rhinebeck. His social activities included membership in the Bankers Club of N. Y. and the Sons of the American Revolution.

Funeral services were held January 3 at the Reformed Church in Rhinebeck, followed by burial there.

Surviving Mr. Brown are his widow and two sons.

George A. Genseke

GEORGE A. GENSEKE, 54, passed away December 29, after a prolonged illness, in a Chicago hospital. He was the junior member of the firm of Genseke Brothers, producer of chemical compounds, W. 48th Place and South Whipple St., Chicago, Ill. The deceased was actively identified with the rubber industry for a number of years and successfully introduced several products to the industry, which have gained an international acceptance. He was also actively identified with the Chicago Rubber Group.

Mr. Genseke is survived by three sisters and one brother, Herbert J. Genseke, who will conduct the business as heretofore.

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L. ALBERT & SON
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(Classified Advertisements Continued on Page 685)

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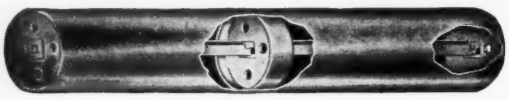

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BROOKLYN COLOR WORKS, Inc.
Morgan and Norman Aves. Brooklyn 22, N. Y.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	November, 1947		November, 1946	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Balata ..... lbs.	1,833	$ 3,743	700	$ 2,533
Crude rubber ..... lbs.	3,461,746	588,850	17,523	4,875
Latex ..... lbs.	269,644	81,816	367,565	67,641
Rubber, powdered and waste ..... lbs.	132,800	10,515	1,554,100	31,643
Recovered ..... lbs.	1,947,700	158,075	1,752,800	140,456
Synthetic and substitute ..... lbs.	210,600	57,892	213,200	52,027
TOTALS	6,024,323	$ 900,891	3,905,888	$ 299,175
PARTLY MANUFACTURED				
Comb blanks of hard rubber	.....	$ 2,633	.....	$ .....
Hard rubber in rods or tubes ..... lbs.	677	761	1,010	930
Rubber thread, not covered ..... lbs.	3,754	5,280	5,794	9,195
TOTALS	4,431	$ 8,674	6,804	$ 10,125
MANUFACTURED				
Belting	.....	$ 99,411	.....	$ 56,218
Boots and shoes of rubber, n.o.p. ..... prs.	57,657	77,470	21,179	13,108
Canvas shoes with rubber soles ..... prs.	1,030	2,749	258	785
Cement	.....	38,337	.....	38,100
Clothing of waterproofed cotton or rubber	.....	6,424	.....	8,015
Druggists' sundries	.....	63,848	.....	51,321
Gaskets and washers	.....	38,668	.....	18,711
Gloves ..... doz. prs.	640	3,257	2,164	9,120
Golf balls ..... doz.	139	673	658	3,533
Heels ..... prs.	3,389	459	8,230	1,347
Hose	.....	33,641	.....	42,162
Hot water bottles	.....	3,634	.....	4,061
Inner tubes, n.o.p. ..... no.	1,471	2,738	7,662	45,559
Bicycle ..... no.	7,648	3,222	1,456	965
Liquid sealing compound	.....	10,657	.....	10,608
Mats and matting	.....	59,451	.....	60,399
Nursing nipples ..... gross	1,532	4,546	1,394	4,061
Packing	.....	9,900	.....	9,078
Raincoats ..... no.	750	1,206	2,354	7,451
Tires, pneumatic, n.o.p. no.	9,765	115,015	17,326	671,074
Bicycle ..... no.	2,361	2,047	5,748	5,501
Solid for automobiles and motor trucks no.	65	1,499	29	545
Other	.....	2,986	.....	6,666
Tire repair material	.....	4,389	.....	43,981
Other rubber manufactures	.....	353,784	.....	326,420
TOTALS	.....	$ 940,011	.....	$1,438,789
TOTAL RUBBER IMPORTS	.....	$1,849,576	.....	$1,748,089

Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber ..... lbs.	1,351,082	$ 240,737	6,948,435	$1,282,298
Waste rubber ..... lbs.	1,250,500	16,563	1,280,000	16,103
TOTALS	2,601,582	$ 257,300	8,228,435	$1,298,401
PARTLY MANUFACTURED				
Soling slabs of rubber .. lbs.	8,201	$ 1,584	3,937	$ 1,099
MANUFACTURED				
Bathing caps	.....	$	.....	$ 44
Belting, n.o.p. ..... lbs.	293,921	227,413	217,369	129,998
Belts, fan	.....	5,531	.....	3,606
Boots and shoes of rubber, n.o.p. ..... prs.	341,882	510,263	114,851	224,186
Canvas shoes with rubber soles ..... prs.	87,633	96,297	158,806	153,813
Clothing of rubber and waterproofed clothing	.....	36,773	.....	23,534
Heels ..... prs.	16,042	1,323	379,851	19,584
Hose	.....	101,040	.....	59,920
Inner tubes for motor vehicles ..... no.	45,075	110,664	25,260	64,605
Soles ..... prs.	3,110	460	26,646	3,956
Tires, pneumatic for motor vehicles .... no.	72,795	1,241,501	25,091	380,938
Other ..... no.	5,218	5,825	314	997
Wire and cable, copper insulated	.....	258,454	.....	54,732
Other rubber manufactures	.....	83,078	.....	66,455
TOTALS	.....	$2,684,622	.....	$1,186,368
TOTAL RUBBER EXPORTS	.....	$2,943,506	.....	$2,485,868

"Sodium Acetate as an Activator of Neoprene Vulcanization." BL-221, November 30, 1947. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8 pages. This bulletin presents test data and charts showing that sodium acetate activates the vulcanization of neoprene compounds which are cured longer than 50 minutes at 281° F., or the equivalent at other temperatures. If sodium acetate is added as a water solution, its activating effect is evident in even shorter cures.

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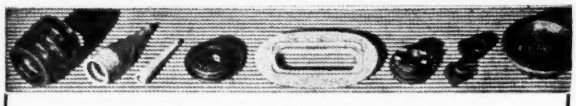

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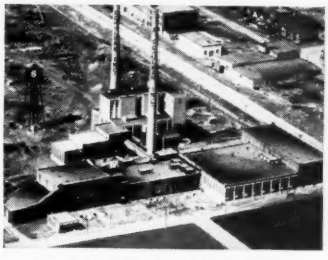

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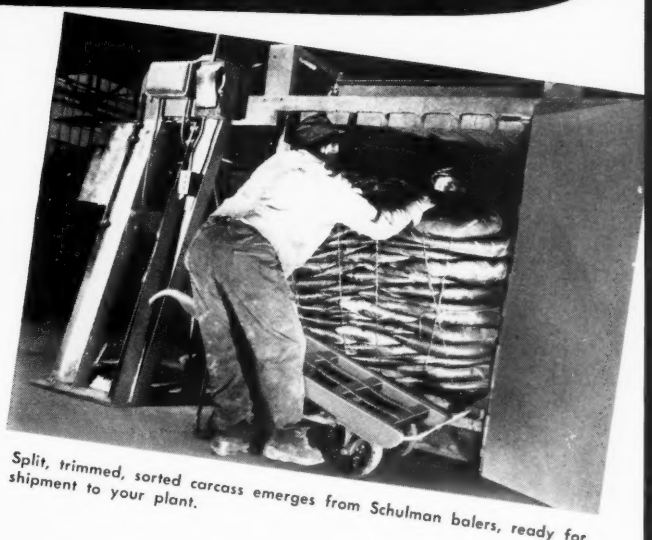
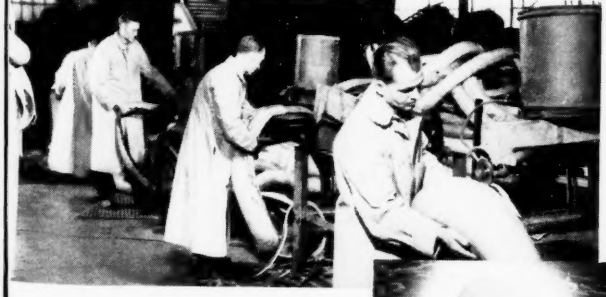


Split, trimmed, sorted carcass emerges from Schulman balers, ready for shipment to your plant.



Trimming light-colored carcass to eliminate tread and sidewall rubber. Clean tire parts of any type is available.

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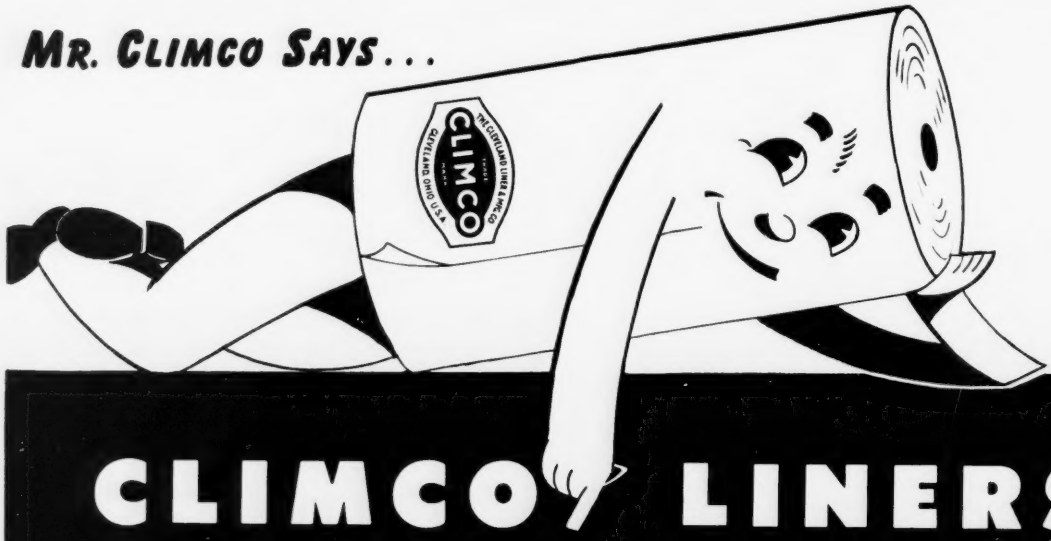

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Permit Horizontal Storage of Stock

Horizontal storage is usually easier and more efficient — vertical storage has a tendency to curl the edges of the stock and liner, causing stock losses. When your liners are Climco Processed, you can confidently store them horizontally because the pressure of the roll will not cause sticking.

Climco Processed Liners will help you — whatever your method of storage.

They speed work by stopping stock adhesions and insuring easy separation. The life of your liner is increased, tackiness of the stock is preserved and loss of stock reduced. In addition to these production benefits, Climco Processed Liners protect the stock itself in many important ways.

Since 1922 Climco Processed Liners have proved their worth to the rubber industry. Give them a trial in your plant.

ILLUSTRATED LINER BOOKLET

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